THE MULTILEVEL INTERPLAY OF TEAM HEALTH CULTURE, DEPARTMENT HEALTH CULTURE, AND EMPLOYEE HEALTH MOTIVATION TO PREDICT HEALTH BEHAVIORS AND JOB SATISFACTION

A Dissertation
Presented to
The Academic Faculty

by

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In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in the
School of Psychology

Georgia Institute of Technology
May, 2020

The Multilevel Interplay of Team Health Culture, Department Health Culture, and Employee Health Motivation to Predict Health Behaviors and Job Satisfaction

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DEDICATION

To the many psychologists who have inspired me and taught me to think critically about the world around me

ACKNOWLEDGEMENTS

As any psychologist should know, successful behaviors typically involve both contributions by the individual and environmental influences, and the completion of this dissertation is no exception. First, I would never be where I am today without the wonderful social support in my life. Specifically, I deeply appreciate my parents for providing encouragement and making it possible for me to follow my passion and major in psychology as an undergraduate. Similarly, I am grateful for the three wonderful psychologists that I met early in my academic career, Jan Daniel, Dr. John Carton, and Dr. Leah Zinner, that sparked and fueled that passion. Outside of psychology, I still largely credit my ability to write effectively to Patricia Carmen, whose dedication to her students' development is unparalleled. Throughout my time at Georgia Tech, my friends and significant other, Gil Margolies, listened to hours of me talking about my research and uplifted me whenever I experienced setbacks. Of my many outstanding friends, I especially want to acknowledge Marisa Manuel for her thoughtful proofreading of this manuscript and Janet Wood, who has helped me in too many ways to list. I appreciate the leadership at "Company Y" for partnering with me to make this study a reality as well as all of the employees that took time out of their schedule to participate. Last, I want to thank Victoria Pham for her contributions as a research assistant on this project, my committee members for their time and thoughtful feedback, and my advisor, Dr. Ruth Kanfer, for her mentorship over the past four years. She has created an encouraging and empowering environment that has allowed me to develop into the psychologist that I am today.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

To combat rising healthcare costs (WHO, 2018), organizations are focusing on strategies to improve employee health, such as creating a culture of health throughout the entire organization. Despite theories about organizations containing multiple levels of culture (Chao, 2000), most studies of organizational culture have only focused on one level at a time (Chatman & O'Reilly, 2016). To address these gaps, I measured employee health motivation and health culture at the team and department levels in a midsized, multinational organization ($N_{Emp.}$ = 282, N_{Teams} = 63, $N_{Dept.}$ = 39) to predict employees' diets, physical activity, alcohol consumption, smoking behaviors, and job satisfaction. Hypotheses were tested using multilevel models. Team weight maintenance culture positively predicted vigorous physical activity above and beyond department culture. No level of health culture predicted diet, alcohol consumption, or smoking behaviors, and department health culture failed to relate to any health behavior. Though health motivation failed to interact with health culture at any level, it did significantly relate to employees' physical activity, vegetable consumption, and smoking behaviors. Last, both team health culture and health motivation positively predicted job satisfaction. Results are discussed in terms of motivated action theory (DeShon & Gillespie, 2005) and situational strength (Mischel, 1976).

CHAPTER 1: INTRODUCTION

Both practitioners and researchers concur about the importance of organizational culture. Over 80% of HR leaders and senior executives hold the view that a strong culture has the potential to be a competitive advantage (Deloitte University Press, 2016). At the same time, research interest for the topic has steadily increased over the past few decades (Chen, Cheung, & Law, 2012; Giorgi, Lockwood, & Glynn, 2015). As of 2011, over 4,600 articles were written on the topic (Hartnell, Ou, & Kinicki, 2011), and though some researchers believe that the field has stagnated (Chatman & O'Reilly, 2016), others have called culture the "darling of the management consulting world" (Schneider, Ehrhart, & Macey, 2013, p. 369).

Despite this widespread interest in the management literature, fewer articles on the topic are being published in psychology-focused journals (Schneider et al., 2013). For instance, in their systematic review of the role of organizational culture in influencing an organization's environmental actions, Fernandez and colleagues (2003) included no articles from psychology outlets. Furthermore, even when culture seems to be a topic of interest in psychology journals, researchers frequently group it together with climate. For instance, in their review of prominent topics published in the *Journal of Applied Psychology*, Kozlowski, Chen, and Salas (2017) list culture as one of the most frequent topics covered in the journal. Unfortunately, their analyses combine culture and climate together, likely overinflating the amount of psychological culture research, as climate has long been a popular research area for psychologists (Pettigrew, 1990; Schneider et al., 2013).

This disconnect between the psychology and culture literatures is alarming because most definitions of culture rely on at least one psychological construct (Verbeke, Volgering, & Hessels, 1998), including unconscious assumptions (Schein, 1985, 2010), values (Quinn & Rohrbaugh, 1983), and climate (Golaszewski, Allen, & Edington, 2008). Consequently, researchers have criticized culture studies for conflating these psychological constructs and for using them arbitrarily (Sackman, 1991), and many prominent models and definitions of culture fail to distinguish where one construct ends and another begins. Furthermore, though psychologists by no means have a monopoly on studying unconscious biases, values, and norms, prominent culture scholars have questioned the role of industrial/organizational (I/O) psychologists in studying the construct (Schein, 1990). Clearly, if psychological constructs constitute such a large portion of the culture construct, I/O psychologists should help to shape the literature.

Moreover, although culture predicts organizationally relevant outcomes, such as turnover (Cronley & Kim, 2017; Glisson & James, 2002; O'Reilly, Chatman, & Caldwell, 1991; Sheridan, 1992) and performance (Bezrukova, Thatcher, Jehn, & Spell, 2012; Hartnell et al., 2011; Smart & St. John, 1996), culture also predicts psychological constructs. These constructs include team cohesion (Gelfand, Leslie, Keller, & de Dreu, 2012; Sánchez & Yurrebaso, 2009), job satisfaction (Cronley & Kim, 2017), engagement (Rofcanin, Las Heras, & Bakker, 2017; Williams, Manwell, Konrad, & Linzer, 2007), and person-environment fit (O'Reilly et al., 1991). Once again, with culture's connection to a wide array of valuable psychological phenomena, the relative dearth of research by psychologists is surprising.

As the field has matured, researchers have begun moving away from studying culture as a global construct to investigating culture "for something" (Schneider, 1975; Zohar & Hofmann, 2012). Examples include patient safety culture (Sammer, Lykens, Singh, Mains, & Lackan, 2010), work-family culture (Thompson, Beauvais, & Lyness, 1999), and health culture (Allen, 2002). The latter is of particular importance to governments, organizations, and employees around the world.

Many countries' total spending on healthcare costs is growing faster than their gross domestic product (GDP; WHO, 2018), and more than two-thirds of organizations identify poor employee health habits as their largest barrier to maintaining affordable health benefits (Watson, 2011). Furthermore, evidence exists that many unhealthy behaviors are on the rise (Blackwell & Clarke, 2018; Devito, French, & Goldacre, 2018; Onufrak, Zaganjor, Pan, Park, & Harris, 2018). For instance, in the United States, as the obesity rate among working-age adults continues to grow (Devito et al., 2018), less than one third of working Americans get the recommended amount of weekly physical activity (Blackwell & Clarke, 2018). At the same time, one in five Americans consume approximately 1300 calories of food each week at work, and the majority of these calories originate from vending machines or free food that is high in fat, sodium, and added sugars (Onufrak et al., 2018). Moreover, unhealthy behaviors extend beyond the United States. In Vietnam, for instance, the average per capita consumption of alcohol for adults almost doubled over a five year period in the mid 2000s (Lincoln, 2016), and the deleterious effects of smoking account for almost 1% of the country's total GDP (Hoang Anh et al., 2016). Though the exact problematic health behaviors seem to differ across countries, the financial (WHO, 2018) and health consequences (Batty et al., 2008; Batty,

Shipley, Marmot, & Davey Smith, 2002; Haapanen, Miilunpalo, Vuori, Oja, & Pasanen, 1996; Heidemann et al., 2008; Lahti, Holstila, Lahelma, & Rahkonen, 2014; Teo et al., 2006) of these behaviors cut across borders.

Despite these grim trends, evidence does exist that employers can positively influence the health and health behaviors of their workers by adopting health-focused policies (Biener, Hamilton, Siegel, & Sullivan, 2010), changing the work environment (Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008), and incentivizing healthy behaviors (Mantzari et al., 2015). Unfortunately, though some organizations report improved employee health and multimillion dollar savings from their wellness programs (Berry, Mirabito, & Baun, 2010), wide variation exists in the efficacy of wellness initiatives, with many resulting in no changes in employee health or in the frequency of healthy behaviors (Mattke et al., 2013). For these programs to be effective, they must account for the relevant contextual factors that shape how employees interpret them (Allen, 2002; Johns, 2006). When initiatives are woven together into a coherent gestalt that accounts for important contextual factors, such as the organization's culture, their effects are amplified (Haynes et al., 2011). Despite understanding the importance of organizational culture, however, our understanding of how health culture relates to employees' health behaviors, individual differences, and affective states is nascent and contains notable theoretical gaps.

The current study investigates three critical gaps in the health culture literature. The first gap pertains to the absence of studies examining multiple levels of health culture simultaneously. This gap is significant because culture, including health culture, is presumed to be multilevel (Chao, 2000). Although theories exist about how cultures

transcend organizational levels and how subcultures arise (Trice & Beyer, 1993), quantitatively-oriented researchers have called for more empirical support of these theories (Chao, 2000; Chatman & O'Reilly, 2016). The current study fills this gap by simultaneously studying health culture at the team and department levels to provide quantitative evidence for a multilevel perspective.

Second, most studies in the health culture and health climate literature only look at direct relationships between these constructs and employee health behaviors. In doing so, these studies largely ignore the potential moderating effects of individual differences in employees. Researchers who have explored individual differences have tended to employ either temporary state variables (Sonnentag, Pundt, & Venz, 2017) or examined these effects in post-hoc exploratory analyses (Schulz, Zacher, & Lippke, 2017). The current study extends research findings by Sonnentag and colleagues (2017) in this area by studying the potential moderating effects of trait-level health motivation in the relationship between health culture and a range of health behaviors.

Third, for many health culture studies, the criterion variables focus only on employee health behaviors. Though health behaviors are clearly important, health culture's relationship to more obvious physical health symptoms and diseases tends to overshadow its potential relationship to affective outcomes, including organizational commitment (Ernsting, Schwarzer, Lippke, & Schneider, 2013) and employee happiness (Jia, Gao, Dai, Zheng, & Fu, 2017). Thus, I also investigate the benefits of alignment between employees' health motivation and their team and department's health culture on employees' job satisfaction.

1.1 What is Health Culture?

Researchers have long bemoaned the ambiguity inherent in many definitions of culture, going so far as to blame this lack of precision for the perceived stagnation of the field (Chatman & O'Reilly, 2016; Pettigrew, 1990; Sackman, 1991). With over 50 definitions of culture, many of which are contradictory (Jung et al., 2009; Verbeke et al., 1998), this concern appears well-justified. Furthermore, despite many reviews dedicated to distinguishing culture from other constructs, most notably climate, researchers continue to conflate it with said constructs (James et al., 2008; Pettigrew, 1990; Schneider et al., 2013; Verbeke et al., 1998; Zohar & Hofmann, 2012). Unfortunately, conceptual confusion in the health culture and health climate literatures mirrors many of the same nomological pitfalls as their parental constructs.

To mitigate this confusion, I rely on past models (Golaszewski et al., 2008; Schein, 2010) and theories (Chan, 1998; Cialdini, Raymond, & Carl, 1990; James et al., 2008) to define health culture as *the objective work environment, shared descriptive norms, and shared climate in collectives that communicate how members should think and act regarding their health.*

In this definition, the work environment refers to relevant objective aspects of an organization, such as policies, procedures, or structural components (e.g., stocking the vending machine with healthy snacks; having a wellness program). Descriptive norms refer to the shared beliefs about the behaviors that people undertake related to health (Cialdini et al., 1990). These shared norms are matter-of-fact and involve no interpretation as to why they occur (e.g., people at my organization bring in healthy lunches; people on my team exercise together). In contrast, the organizational climate is

the shared, imputed meaning among individuals about the work environment, norms, and people in the organization (e.g., my colleagues *would* like a company event more if it had free alcohol; James et al., 2008; Schneider et al., 2013). Unlike norms, the climate is subjective and evaluative and goes beyond what is directly observable. For example, a self-report item assessing descriptive norms may be that people on my team take the stairs, whereas a climate item would be that people on my team dislike exercising. Taking the stairs is an observable behavior, but disliking something involves inferring from peoples' behavior or requires them to vocalize their attitudes.

While on the subject of health climate, it is important to explicitly state why it is a facet of health culture; as is the case with their more general counterparts, these constructs are easy to confuse. A full review of the distinctions between climate and culture falls outside the scope of this thesis (for two excellent articles on the subject, see James et al., 2008 and Zohar & Hofmann, 2012). However, these constructs can be contrasted at a high level in two key ways.

First, climate is narrower in scope than culture. Climate *only* involves subjective perceptions and imputed meanings. In contrast, most conceptualizations of culture involve both subjective *and* objective dimensions (James et al., 2008; Schein, 2010; Schneider et al., 2013; Schneider, González-Romá, Ostroff, & West, 2017). It makes sense that climate is subsumed by culture because meaning becomes derived from the policies and behaviors present in an organization (Golaszewski, Allen, et al., 2008; Pettigrew, 1990). For instance, though an objective norm of taking the stairs may exist, individual interpretations of that norm will influence how each person acts, thereby affecting the overarching culture. If an individual interprets taking the stairs as her

coworkers valuing their health, then she should be more likely to do other healthy behaviors, such as eating healthy snacks. In contrast, if the elevators happen to be frequently broken, then this normative behavior should not be interpreted as a value of health and rather as a practical decision. As a result, this behavior should not reflect on the greater health culture. Thus, *culture subsumes climate, and climate frames employees' interpretations of the behaviors and work environment around them.*

Second, and most important, climate is a property of the individuals reporting it, whereas culture is a property of the organization (James, 1982; James et al., 2008; James & Jones, 1974). For instance, though the climate may involve perceptions *about* an organization (or team or department), these perceptions are ultimately *held by* individuals. In contrast, because culture is objective, all aspects of it must be verifiable. This verification is easy with the objective work environment; however, to ensure that psychological perceptions are "true" representations of the culture, researchers must ascertain sufficient interrater agreement (LeBreton & Senter, 2008; Rousseau, 1990). Once researchers verify the consistency of these perceptions, they can be confident that these subjective perceptions are anchored in aspects of the organization and not due to idiosyncrasies of individuals reporting them. To summarize, the second major difference between these constructs is *climate is a property of the individuals reporting it, and culture is a property of the organization.*

Thus, health culture and health climate are related but still have meaningful differences. Unfortunately, both literatures contain empirical studies that, in their measurement decisions, violate critical dimensions of their construct's definition. For instance, in their study of health climate, Sonnentag and Pundt (2016) include survey

items that ask objective questions (ex., “Employees from this organization pay reduced fees in fitness centers,” p. 269). These objective questions disregard that climates are inherently subjective and interpretative (Schneider et al., 2013). Similarly, after analyzing their data, Jia, and colleagues (2017) advocate studying “health culture at the individual level” (p. 10), despite this contradicting most definitions of culture as shared among individuals (Verbeke et al., 1998). Though a formal critique of these literatures also falls outside the scope of this thesis, these issues are mentioned to highlight that many studies in both literatures cross-contaminate these constructs. Because of this pervasive cross-contamination and the current health culture literature being sparse, I cautiously draw from empirical findings in both domains to support my hypotheses in this thesis.

Although some studies focus on a homogenous health culture or climate (Basen-Engquist, Suchanek Hudmon, Tripp, & Chamberlain, 1998; Kwon, Marzec, & Edington, 2015; Schulz et al., 2017), many researchers dissect this construct into facets that focus on certain health behaviors, such as healthy weight maintenance climate (Sliter, 2013) or healthy eating climate (Sonnentag & Pundt, 2016). Just as cultures for something predict more variance than general culture measures (Schneider, 1975; Zohar & Hofmann, 2012), focusing on specific health behaviors rather than more general health climate tends to predict more meaningful variance in behavior (e.g., Basen-Engquist et al., 1998 versus Sonnentag & Pundt, 2016). Thus, this thesis follows this trend toward specificity (i.e., Sabree & Kanfer, 2020) and parses health culture into three facets: weight maintenance culture, antismoking culture, and responsible drinking culture.

1.2 Health Culture is Multilevel

Though some researchers debate the subcomponents of culture, almost all definitions, including the one used in this thesis, agree on one key aspect: culture is shared among individuals (Verbeke et al., 1998). This nuance makes any culture a multilevel phenomenon with individuals nested within some meaningful collective (Chao, 2000; Glisson & James, 2002; Hofstede, 1998; Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013; Pettigrew, 1990). To date, most health culture and health climate research has focused only on the organizational or worksite level (Kwon et al., 2015), with the sole exception being Schulz and colleagues' (2017) study on team health climate.

Because individuals share a culture, multiple individuals must be surveyed to establish interrater agreement about its subjective dimensions, such as norms and climate (Rousseau, 1990). Furthermore, diverse representation is paramount to accurately assess culture (Chao & Moon, 2005). Zyphur, Zammuto, and Zhang (2016) demonstrated the importance of this point by stratifying their sample into managers and non-managers. Across 67 hospitals, managers viewed their hospital's culture as significantly more innovative and humanistic than non-mangers. Unfortunately, many studies of organizational culture only include either one person per collective or only sample individuals from one job type, such as managers (Hartnell et al., 2011).

Even with a diverse sample, most employees belong to multiple collectives within an organization, such as a team nested within a department. Because cultures can clash across levels in an organization (Bezrukova et al., 2012), prominent culture theorists argue that researchers must study multiple layers of culture within an organization at a

time to capture their effects (Chao, 2000). Recently, health culture researchers have echoed the same sentiment (Marzec, 2018).

Despite these calls to action, empirical studies that compare subcultures to the larger cultures that they are nested in remain sparse, and no such examples exist within the health culture or health climate literatures (Morgan & Ogbonna, 2008). This gap is significant because theories exist about subcultures (Chao & Moon, 2005; Trice & Beyer, 1993; Zohar, 2000) and the importance of cultural alignment (Tosti, 2007; Zohar & Luria, 2005) with only limited quantitative data to support them. Furthermore, even when researchers have explored multiple levels of an organization's culture, many studies fail to use proper methods. For instance, Lok, Westwood, and Crawford (2005) studied how ward (department) culture and hospital (organizational) culture predict organizational commitment. Though they found that a supportive ward culture had a significantly stronger relationship with organizational commitment (d = 1.06) than a supportive hospital culture (d = .49), they failed to use multilevel modeling (MLM) to account for the nested structure of their data. Similarly, despite having multiple raters per collective, they never ascertained interrater agreement. Thus, as they correctly state, their study "only analyzed *perceptions* of culture," (emphasis in original, p. 509). These issues further conflate culture and climate and typically cause an upward bias in results (Snijders & Bosker, 2012).

Nonetheless, a handful of strong studies on the subject exist. Most notably, Zohar and Luria (2005) tested a multilevel model of climate to predict safety behaviors. According to their model, employees try to make sense of the distal procedural cues and more proximal practice cues in their environment. In their study, a procedural cue may

include general messaging from senior management that safety is a key goal, and employees' interpretations form the organizational safety climate. The proximal day-to-day directives from employees' supervisors form the group safety climate, and this group climate can either align with or contradict the organizational climate. They theorized that most group climates would align with their organization, so they tested a full mediation model that had group climate mediating the relationship between organizational climate and employee safety behaviors. Though their results supported their model, they also noted that significant variance was present in some group climates. Thus, though Zohar and Luria's (2005) full mediation model could not capture these cross-level discrepancies, they noted that future research should explore them.

Bezrukova and colleagues (2012) answered that call by examining the effects of cultural misalignment in department and group results-focused culture on group performance. Unlike Zohar and Luria (2005), they did not force group culture to mediate the effects of department culture and instead treated culture alignment as a moderator. They found that when both the department and group culture emphasized results, group performance, as measured through group stock payouts and bonus, was highest. Performance was lowest when neither culture emphasized results, and both types of misalignment fell in between these extremes. According to their results, fears of cultural misalignment may be unwarranted (Tosti, 2007). Instead, the larger threat seems to be having ineffective cultures at any level in an organization.

Interestingly, both studies (Bezrukova et al., 2012; Zohar & Luria, 2005) found only a moderate or no relationship between group culture/climate and higher-order cultures. Zohar and Luria (2005) report a correlation of .41 between group and

organizational safety climate, and Bezrukova and colleagues found no relationship between department and group culture (r = .00). These data provide support for theorizing by Chao (2000) that researchers should not assume that all levels of culture communicate the same message. As such, I make the following hypothesis:

Hypothesis 1: Teams are embedded in departments. Team health culture will be distinct from department health culture at the aggregate level (1a) as well as at each of the facet levels: namely, weight maintenance culture (1b), responsible drinking culture (1c), and antismoking culture (1d).

1.3 Health Culture and Health Behaviors

Despite only being studied at one level at a time, health culture and climate have been linked to a variety of health behaviors and health outcomes, including a positive relationship with subjective health (Jia et al., 2017; Schulz et al., 2017) and a negative relationship with body mass index (BMI; Sliter, 2013). Most of the current health culture and climate literature has focused on its relationship with employee physical activity and diet. For instance, multiple studies have found a moderate, positive relationship (d range from .32 to .85) between respondents' physical activity and their organization's health climate (Ribisl & Reischl, 1993; Sliter, 2013). In regard to health climate and diet, empirical findings are mixed. Basen-Engquist and colleagues (1998) failed to find a relationship between health climate and any aspect of healthy eating; however, other studies have demonstrated a moderately positive relationship (d range from .47 to .85) between respondents' diet quality and their organization's health climate (Ribisl & Reischl, 1993; Sliter, 2013). More specifically, Sonnetang and Pundt (2016) found that

organizational health climate shared a moderately positive relationship with intake of fruits and vegetables (d = .37) but had no relationship with intake of sugary snacks.

Only two studies have explored health climate and smoking, with the most recent still happening more than 20 years ago (Basen-Engquist et al., 1998; Ribisl & Reischl, 1993). Neither study found a relationship, but these null findings may be due to measurement issues. In both studies, researchers explored the relationship between health climate and smoking *status* rather than smoking *behavior*. By dichotomizing smoking, both studies substantially reduced their power to detect potential effects. This dichotomization is unfortunate, as smoking patterns are highly variable among smokers, especially when they are trying to quit (Hughes, Shiffman, Naud, & Peters, 2017). In light of these methodological limitations, the relationship between health climate and smoking behavior seems to still be inconclusive.

Though researchers have documented the effects of drinking cultures on adolescents (Bräker & Soellner, 2016; Workman, 2001), surprisingly little research has been done regarding drinking behaviors and health culture among working adults, despite calls for research on the topic (Ames & Janes, 1992). Ames, Grube, and Moore (2000) conducted the most extensive study on the topic and dissected a plant's drinking culture into the subjective approval of drinking at work (climate) and drinking norms set by others. The more disapproval that employees feared for drinking at work, the less likely they were to do so (d = .21). In contrast, other employees drinking at work increased the likelihood that participants would follow their lead (d = .34), and the effects of these norms intensified when participants thought of their coworkers as their friends (d = .84).

Despite these documented relationships between health climate and health culture with health behaviors, researchers should accept the majority of these findings cautiously for two reasons. First, some of these studies only used one participant per collective.[1] Because both of these studies claimed to study climate, not culture, this decision holds up theoretically;[2] nonetheless, it raises concerns about the potential for common method bias (CMB) upwardly inflating these results (Ostroff, Kinicki, & Clark, 2002; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff & Organ, 1986). Though evidence exists that the negative effects of CMB may be smaller than once suspected (Spector, 2006), this limitation still warrants some skepticism of these findings.

On the opposite end but of greater concern, the majority of studies *did* sample multiple people per collective but then conducted all analyses at the individual level (Ames et al., 2000; Basen-Engquist et al., 1998; Jia et al., 2017; Ribisl & Reischl, 1993). For instance, Ribisl and Reischl (1993) examined the relationship of health climate with physical activity, diet, and smoking using 234 employees from six vastly different worksites (i.e., a firehouse, a college department, a computer programming office, etc.). In their results, they report finding "climate differences between the companies" (p. 819), and they cite this as support for their hypothesis that health climates can vary by

[1] Technically, Sonnentag & Pundt (2016) *did* use multiple raters per organization in Study 3, but the only purpose of this study was to show that employees agree on their organization's health climate. Other than showing sufficient interrater agreement, they did not use these results to predict any other criteria, unlike Study 2 that had only one rater per organization.

[2] Although *psychological* health climate can be assessed with just one rater per collective, in both studies Sonnentag & Pundt (2016) and Sonnentag et al. (2017) claim to be studying *organizational* health climate, which necessitates multiple raters per collective (James & Jones, 1974). Thus, though they are right that they can only study climate with one rater, they are incorrect in *what* climate they are claiming to measure.

worksite. However, they then proceed to report all of their relationships between health climate and these health behaviors *at the individual level, without controlling for worksite membership*. By disregarding group membership—especially after it has already been shown to significantly predict variation—Ribisl and Reischl's study, like others that made the same error, likely inflated the relationship between health climate and these health behaviors (Snijders & Bosker, 2012).

Despite these widespread errors, two of the reviewed studies provide exemplary methods for studying health climate or health culture at the organizational (Sliter, 2013) or team levels (Schulz et al., 2017). In both examples, the researchers sample multiple individuals per collective, demonstrate sufficient interrater agreement with intraclass correlations (ICCs) or *rwg* statistics (LeBrenton & Senter, 2008), and account for the dependencies among their observations. These robust methods increase confidence in Sliter's (2013) findings that organizational healthy weight maintenance climate positively predicts diet quality (d = .85) as well as physical activity (d = .85) and negatively relates to BMI (d = -.37). Similarly, though Schulz and colleagues' (2017) study is one of the few *not* to look at the relationship between health climate and health behaviors, they provide strong support that team health climate relates to a variety of health-related outcomes, including employee subjective health (d = .22), mental health (d = .22), and presenteeism (d = -.16). As the health culture and health climate literatures continue to evolve, researchers should look to these studies as gold standards. Furthermore, though Sliter (2013) has provided evidence for health climate's relationship with diet and exercise, no empirical study has examined smoking or drinking with any aggregated measure of health climate or health culture. Thus, the proposed study aims to replicate

and extend Sliter's findings by also formally offering the following novel hypotheses concerning alcohol consumption and smoking behaviors, respectively:

Hypothesis 2: Team responsible drinking culture (2a) and department responsible drinking culture (2b) will negatively predict alcohol consumption.

Hypothesis 3: Team antismoking culture (3a) and department antismoking culture (3b) will negatively predict smoking behaviors.

1.4 Health Culture and Health Motivation

Due to the nascency of the health climate and health culture research literatures, most studies have only explored their direct relationships to health behaviors and health outcomes. However, environmental cues, especially distal ones at an organizational level, rarely exert direct effects on behavior. Rather, distal stimuli typically influence behavior indirectly through more proximal sources, such as individual differences in employees and their self-regulation strategies (Kanfer, 1990, 1992). One such individual difference that culture exerts its effects through is employee motivation (Christian, Bradley, Wallace, & Burke, 2009; Sonnentag et al., 2017).

Many theories have been applied to explain the culture-motivation relationship, including the theory of planned behavior (Fishbein & Ajzen, 1975; Wiener & Vardi, 1990), social learning theory (Bandura, 1986), and motivated action theory (DeShon & Gillespie, 2005). With each of these theoretical approaches, individuals are proposed to take cues from their environment as signals about whether their behavior will be rewarded or punished. Motivated action theory (DeShon & Gillespie, 2005) goes a step further by postulating that these cues also work by activating goals held by individuals, assuming that they have goals relevant to the cue.

Empirical studies provide support for the relationship between culture and motivation across a variety of domains. Examples include learning culture and motivation to transfer (Banerjee, Gupta, & Bates, 2017; Egan, 2008), safety climate and safety motivation (Griffin & Neal, 2000; Neal & Griffin, 2006), and even health climate and health motivation (Sonnentag et al., 2017). For instance, one of the most rigorous demonstrations of climate and motivation was demonstrated by Neal and Griffin (2006). Using a cross-lagged design, they found that group safety climate at Year 2 positively predicted employee safety motivation at Year 4, and this increase in employee safety motivation resulted in increased safety behaviors. Moreover, since Griffin and Neal's (2000) first study on the topic, meta-analytic findings of 90 safety studies have also confirmed and extended this path model (Christian et al., 2009).

Though nowhere near as established as the safety climate literature, researchers have begun linking an organization's health climate to employees' trait and state health motivation. Sliter (2013) did not test any path models between health climate, health motivation, and health behaviors; however, in addition to finding that an organization's healthy weight maintenance climate positively related to diet and physical activity, she also found a positive relationship between health climate and employees' trait health motivation (d = .72). In a similar vein, Sonnentag and Pundt (2017) explored the relationship among health climate, diet, and *state* health motivation. In their study, 247 employees completed a questionnaire about their organization's eating climate, and then over a period of ten days, recorded their snacking behaviors and daily health motivation. Similar to Sliter's (2013) results with trait health motivation, they found a direct, positive relationship between health climate and state health motivation (d = .28). In addition to

this direct effect, they also found that participants' state health motivation mediated the relationship between the health climate and participants' fruit consumption.

Despite climate and culture's relationship to motivation being well-documented (Christian et al., 2009), notable gaps still exist. In the health climate literature, the relationship among health climate, health motivation, and health behaviors has only been demonstrated with fruit consumption (Sonnentag et al., 2017). Thus, we currently lack evidence that this relationship will hold with other health-related behaviors, such as physical activity, smoking, and drinking. The latter are especially important because fruit consumption is an approach-oriented behavior, whereas the healthy response for smoking and drinking is to avoid or at least minimize these activities. Though avoidance and approach goals share some similarities, they are conceptually distinct and rely on different forms of self-regulation (Carver, 1996). Even beyond the health culture and health climate literatures, no study has simultaneously compared the effects of two levels of culture on employee health motivation. As team health culture is more proximal to employees than department health culture, it follows that the former exerts a stronger influence on motivation than the latter (Kanfer 1990, 1992).

Thus, in line with past research and motivated action theory (DeShon & Gillespie, 2005), I propose the employees' health motivation moderates the effectiveness of their team and department's health culture. When employees are motivated to engage in health behaviors, a robust health culture serves as a cue for their motivation, making their engagement in these health behaviors more likely. Similarly, when employees are not motivated to engage in health behaviors *and* their environment enables that lack of

motivation, they are even less likely to engage in them. As such, I propose the following moderator hypothesis (for a visualization of Hypothesis 4, see Figure 1):

Hypothesis 4: Team and department health culture will intensify (i.e., moderate) the positive relationships between employee trait-level health motivation and their vigorous (cardiovascular) physical activity (4a), light physical activity (4b), consumption of fruits (4c), consumption of vegetables (4d), and their negative relationships to alcohol consumption (4e) and smoking (4f).

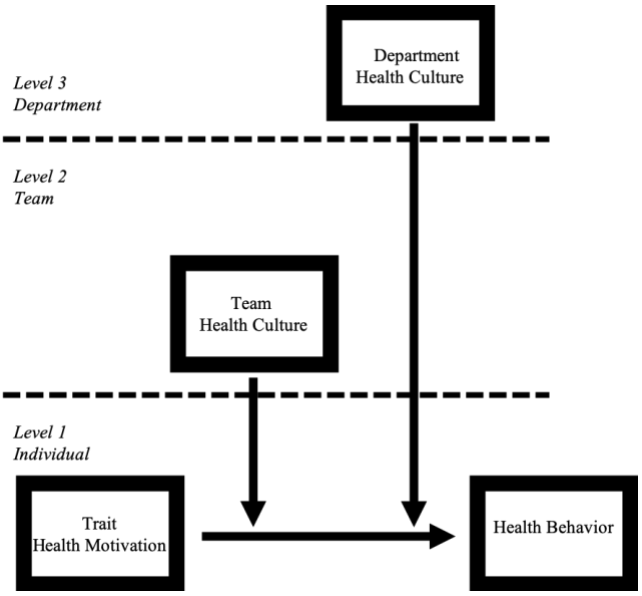


Figure 1. Visualization of Hypothesis 4.

1.5 Health Culture and Job Satisfaction

Researchers have consistently found beneficial outcomes between alignment of employees' values or goals and a collective's culture (Kristof-Brown, Zimmerman, & Johnson, 2005; Verquer, Beehr, & Wagner, 2003). These benefits include both affective outcomes, such as higher job satisfaction (Klaic, Burtscher, & Jonas, 2018), greater influence at work (Anderson, Spataro, & Flynn, 2008), and increased organizational commitment (Vancouver & Schmitt, 1991), and behavioral ones, like reduced turnover

(O'Reilly et al., 1991) and applicants deciding to accept a company's job offer (Cable & Judge, 1996). Though the importance of goal congruence and value congruence has been shown across a wide variety of cultures and climates "for something" (Kristof-Brown et al., 2005; Lopez, Babin, & Chung, 2009), no study has explored the effects of employees' health motivation being congruent with their team or department's health culture. As this section will discuss, filling this gap is important because when people's environment blocks their goals, like living a healthy lifestyle, their frustration may result in negative outcomes to themselves and the collectives in which they belong (Kristof-Brown & Stevens, 2001).

When assessing congruence, researchers can choose among many types; however, value congruence constitutes the bulk of fit research, followed distantly by goal congruence (Verquer et al., 2003). Value congruence refers to the alignment between the collective and employees' values (Edwards & Cable, 2009). On the other hand, goal congruence refers to the individual having goals that align with ones held by the collective (Hoffman & Woehr, 2006). Multiple meta-analyses have shown both types of congruence predict a wide range of organizational outcomes, including turnover, job satisfaction, and organizational commitment (Kristof, 1996), but the effects of value congruence typically exceed those of goal congruence (Kristof-Brown et al., 2005).

Despite these stronger effects of value congruence, goal congruence may be more important when studying health. Previous research has shown that the majority of individuals endorse strong health values, even when their behaviors do not align with those purported values (Ajzen & Timko, 1986). As a result, health values fail to predict behavior. Due to this insufficient variability in health values, goal congruence with

participants' health motivation and the collectives that they belong to stands as a more promising research stream. First, many definitions of motivation conceptualize it as representing self-regulatory efforts to achieve goals, so theoretically, misalignments with employees' motivation and their environment should lead to negative outcomes, such as frustration (Kanfer & Chen, 2016; Kanfer, Frese, & Johnson, 2017). Furthermore, multiple studies have documented that participants vary widely in their motivation to engage in health behaviors, making health motivation a more meaningful individual difference than health values (Moorman & Matulich, 1993; Sliter, 2013). Finally, studying alignments between a collective's health culture and an individual's health motivation rather than their health values answers requests for more research on goal congruence (Hoffman & Woehr, 2006).

In a rare experimental study of goal and value congruence, Kristof-Brown, Jansen, and Colbert (2002) had 205 MBA students read vignettes about fictious work environments and then reported their projected level of work satisfaction. These vignettes varied how much the organization, team, and job aligned with their goals and values. Goal and value congruence across these three domains resulted in higher perceived fit and significantly predicted work satisfaction ($R_2 = .71$); moreover, all three forms of fit interacted with one another. High fit in all areas increased projected work satisfaction above and beyond each main effect. Furthermore, if fit was lower in one domain, being high in the remaining two compensated for the deficiency. These results suggest that individuals consider fit at multiple levels when determining their work satisfaction.

The few other studies that have looked at congruence across levels have studied the phenomena with actual employees (Abdalla, Elsetouhi, Negm, & Abdou, 2018;

Adkins & Caldwell, 2004; Tak, 2011). Adkins and Caldwell (2004) had recruited 136 consultants from a consulting firm and had participants individually report on the culture of their group (team) and organization. To tap into their value congruence with their collectives, participants were then prompted to report on their *ideal* culture for their group and organization. In line with their hypotheses, both person-group (P-G) fit (d = .63) and person-organization (P-O) fit (d = .58) predicted job satisfaction. Unfortunately, they could not run both P-G and P-O fit in the same model due to high correlations among the measures (r = .92). This high correlation is surprising because meta-analytic results show that the average correlation between fit across levels of an organization is much lower (r = .54; Kristof-Brown et al., 2005). Adkins and Caldwell's (2004) high correlation between P-G and P-O fit may be due to measurement choices or peculiarities in their sample. In regard to measurement, participants completed all measures at one time point, and none of the perceptions of culture were verified through other raters. Together, these choices may have inflated relationships among all variables (Ostroff et al., 2002). Measurement aside, their consulting firm's culture may have been consistent throughout the organization, as some organizations have consistent cultures throughout its levels (Zohar & Luria, 2005) while others do not (Bezrukova et al., 2012). If the culture permeated consistently throughout the organization, then participants would either fit in well at both or neither levels.

Abdalla and colleagues (2018) explored how P-G and P-O fit predict turnover intent. In addition to looking at fit at two levels of an organization, they tested fit as both value and goal congruence. P-O fit exerted both direct effects on turnover intent (β = -0.351) and P-G fit (β = 0.891) as well as indirect effects on turnover intent through P-G

fit (β = -0.427). Abdalla and colleagues' (2018) study highlight the need to study congruence across levels simultaneously in order to more accurately capture employees' experience at work. Thus, the proposed study's concurrent investigation of alignment between employees' health motivation and their team and department's health culture should make novel contributions to both the health culture and broader goal congruence literatures.

Finally, in addition to the research to linking goal congruence to positive psychological outcomes, health culture also predicts affective outcomes. These outcomes include greater affective commitment to the organization (Ernsting, et al., 2013; d = .63), increased employee happiness (Jia et al., 2017; d = .80), and reduced employee burnout (Zweber, Henning, & Magley, 2016; d = -.90). Thus, without taking employees' health motivation into account, it stands that health culture should positively relate to employees' job satisfaction. With their goal congruence taken into account, past research would suggest that higher levels of health motivation would intensify this positive relationship, whereas low levels should reverse this relationship. Thus, this dissertation's final hypothesis states:

Hypothesis 5: Employees' health motivation will moderate the positive relationships between their team's health culture and their department's health culture and their job satisfaction. When employees are higher in health motivation, the positive relationship between team and department health culture and their job satisfaction will intensify; however, if employees are low in health motivation, the relationship will reverse.

1.6 The Current Study

I have three primary goals with this dissertation. First, I aim to demonstrate the differential effects of team and department health culture. Second, I attempt to replicate past health culture research regarding weight maintenance behaviors as well as producing the first study to show health culture's relationship for the domains of alcohol consumption and smoking in a Vietnamese sample. Indeed, this study is the second study to examine health culture in a non-western society (the first being Jia et al., 2017 with Chinese employees) and the first to use a primarily Vietnamese sample. Third, I examine how employees' health motivation interacts with the team and department health culture to influence employee health behaviors and job satisfaction.

To make these contributions to the health culture literature, the present study deployed a survey to employees in a midsized technology company with five offices spread across the southeastern United States and Vietnam. Employees reported on their health motivation, job satisfaction, health behaviors, and the health culture of their team and department.

Finally, to summarize I make the following hypotheses:

Hypothesis about the Multilevel Nature of Health Culture

Hypothesis 1: Teams are embedded in departments. Team health culture will be distinct from department health culture at the aggregate level (1a) as well as at each of the facet levels: namely, weight maintenance culture (1b), responsible drinking culture (1c), and antismoking culture (1d).

Direct Effect Hypotheses

Hypothesis 2: Team responsible drinking culture (2a) and department responsible drinking culture (2b) will negatively predict alcohol consumption.

Hypothesis 3: Team antismoking culture (3a) and department antismoking culture (3b) will negatively predict smoking behaviors.

Health Motivation & Health Culture Hypotheses

Hypothesis 4: Team and department health culture will intensify (i.e., moderate) the positive relationships between employee trait-level health motivation and their vigorous (cardiovascular) physical activity (4a), light physical activity (4b), consumption of fruits (4c), consumption of vegetables (4d), and their negative relationships to alcohol consumption (4e) and smoking (4f).

Hypothesis 5: Employees' health motivation will moderate the positive relationships between their team's health culture and their department's health culture and their job satisfaction. When employees are higher in health motivation, the positive relationship between team and department health culture and their job satisfaction will intensify; however, if employees are low in health motivation, the relationship will reverse.

CHAPTER 2: METHOD

2.1 Participants

The participants were employees working for a mid-sized technology (1,200 employees) offshoring company, hence referred to as Company Y, headquartered in the southeastern region of the United States. Despite being headquartered in the United States, the majority of Company Y's workforce is based in one of its four regional offices in Vietnam. Employees at Company Y work on teams, and these teams are frequently nested within certain departments. Though Company Y contains traditional, enterprise-wide departments, like finance and marketing, most departments are organized around the clients that they serve. For instance, many of Company Y's customers contract them to solve multiple, long-term technological issues. Depending on the number and length of the projects, each department may consist of many teams serving the same client in different ways.

Company Y pays 100% of its employees' health insurance. Furthermore, all offices have onsite gyms, and upper leadership is vocal about the importance of exercising and can regularly be seen in the onsite gyms. The Company provides weekly meals and daily snacks for the employees, and employees are allowed to request which snacks are purchased. The Company also provides alcohol at both company-sponsored events and for personal consumption during working hours.

During the data collection period, 618 employees responded to the survey. Responses from 25 employees were dropped as they failed an attention check that asked if they were taking the survey online or in-person. Responses from 3 employees were

dropped because they mentioned that they had taken the survey twice.[3] Last, employees who answered fewer than 50% of the items were dropped. This cut-off was determined by examining the response rates and seeing that a natural break occurred in the response rate at that point. The final participation rate among this sample was over 93% and contained 282 respondents. Of these respondents, 243 identified as Vietnamese, 12 as American, three as Other, and 24 declined to disclose their nationality.

To assess team and department health culture, employees also reported team and department membership. Employees at Company Y are members of discrete teams led by one leader or manager. Thus, teams were operationally defined as reporting to the same leader. For both practical and theoretical reasons, leaders did not provide input on the culture of the team that they lead. Past research has found that managers rate their team's culture more favorably than direct reports (Zyphur et al., 2016) and that many group norms do not apply to leaders (Gelfand, Harrington, & Jackson, 2017; Gelfand et al., 2012). For instance, when leaders' perceptions of their team's safety climate were compared to those of their direct reports, leaders' perceptions were consistently higher than employees' perceptions. Furthermore, though employees' perceptions predicted safety behaviors and objective injury outcomes, leaders' perceptions failed to predict either outcome (Huang et al., 2014).

Team sizes at Company Y range from two to 44 people. Although many researchers have defined teams as consisting of only two members (Delise, Gorman, Brooks, & Rentsch, 2010; Kozlowski & Ilgen, 2006; Mathieu, Hollenbeck, van

[3] As will be explained in the procedure section, midway through the study, the survey was offered to employees in both English and Vietnamese.

Knippenberg, & Ilgen, 2017), this study defines a team as comprised of at least three individuals (including the supervisor) that work toward a common goal. This minimum team size was chosen to ensure that at least two direct reports per team were able to report on their team's culture, so interrater agreement could be established. As a result of these restrictions, the final sample consisted of 63 teams. For department, employees reported which department that they spend the majority of their time serving. The final sample consisted of 39 departments.

2.2 Materials

Though sample items are provided for all items below, a full list of all items can be found in Appendix A.

2.2.1 Health Culture

Work Environment. Because employees work at one of five worksites, the effects of their work environment were statistically controlled for. To assess the work environment at each worksite, one HR representative in Vietnam and the Chief Operations Officer in the United States completed five of the 16 subscales from the Center for Disease Control's (CDC) Worksite Health ScoreCard (Center for Disease Control and Prevention, 2014) for the worksites in their area. Informants were encouraged to work with others to ensure that all responses were accurate. The Health ScoreCard is a modified version of the Organizational Heart Health Assessment (Golaszewski & Fisher, 2002) and has been well-validated and used at over 90 worksites (Roemer et al., 2013). Each item starts with "During the past 12 months, did your worksite." Informants respond with a "Yes" or "No" rating. Each item awards between one and three points. The amount of points per

item was determined by an expert panel based on the importance and evidence for the dimension.

The five subscales were the organizational support (18 items; sample item: "Use examples of employees role modeling appropriate health behaviors or employee health-related "success stories" in the marketing materials?", one point), tobacco control (ten items; sample item: "Provide or promote free or subsidized tobacco cessation counseling?", two points), nutrition (13 items; sample item: "Subsidize or provide discounts on healthier foods and beverages offered in vending machines, cafeterias, snack bars, or other purchase points?", three points), physical activity (nine items, sample item: "Provide an exercise facility on-site?", three points), and weight management (five items, sample item: "Provide brochures, videos, posters, pamphlets, newsletters, or other written or online information that address the risks of being overweight or obese?", one point) subscales.

The nutrition, physical activity, and tobacco control subscales each represent their respective facets of the work environment. Because all of the organizational support items are broad and do not focus on any specific health behavior, this support was intended to be controlled for in all analyses; however, its inclusion made each model rank deficient and, consequently, was deleted from all analyses. Furthermore, all worksites receive the same score for the tobacco control subscale (Tobacco Control = 9), so it too was dropped from all subsequent analyses. The Worksite Health ScoreCard does not ask about alcohol, resulting in no statistical control for the alcohol work environment in subsequent analyses.

Norms and Climate. Unlike the objective work environment, multiple respondents must verify the subjective aspects of the team and worksite health culture (Rousseau, 1990). Participants completed all three subscales of the Health Culture Assessment (HCA, $\propto$ = .95). These three subscales include weight maintenance culture, smoking culture, and drinking culture. Each subscale has two facets: behavioral norms and climate. All items are on a five-point Likert scale that ranges from 1 "Strongly Disagree" to 5 "Strongly Agree." Items either refer to "people on my team" for team culture or "people at my worksite" for worksite culture. Though this scale was made for this dissertation, a pilot study was conducted to support its validity (for in-depth information about this scale's validation, see Appendix B).

Weight maintenance culture ($\propto$ = .96) has three categories of items: diet, fitness, and general health. Sample diet items include "In general, people on my team eat healthy lunches or snacks" (norms) and "Being a part of this team makes it easy to maintain a healthy diet" (climate). Sample fitness items are "In general, people on my team discuss having been physically active" (norms) and "In general, people on my team dislike exercising" (climate). Last, sample items for general health culture include "In general, people on my team encourage each other to make healthy decisions" (norms) and "In general, people on my team are motivated to live a healthy lifestyle" (climate).

For smoking culture ($\propto$ = .90), sample items include "In general, people on my team take smoke breaks" (norms, reverse scored) and "People at my organization think that people should not smoke cigarettes and e-cigarettes" (climate). For drinking culture ($\propto$ = .88), sample items include "In general, people on my team discuss having been

hungover or drinking too much" (norms, reverse scored) and "People at my organization would like if our next company event involved drinking" (climate, reverse scored).

2.2.2 Health Behaviors

Most of the following health behavior questions were adapted from the CDC's annual National Health Interview Survey (National Center for Health Statistics, 2018). As some of these items were originally open-ended, Likert scales were created to reflect options provided for in the protocols.

Diet. Diet quality was assessed with two five-point Likert scale items that measure consumption of fruits and vegetables with options ranging from 1 "Less than 1" to 5 "5 or more servings". A sample item is "How many servings a day do you eat of vegetables?"

Physical Activity. Physical activity was assessed with two five-point Likert scale items that measure light and vigorous (i.e., cardiovascular exercise) physical activities. Options range are 1 "Never", 2 "1 – 2 Days/Week", 3 "3 – 4 Days/Week", 4 "5 – 6 Days/Week" and 5 "Every Day." A sample item includes "On average, how many days per week do you do VIGOROUS leisure-time physical activities for AT LEAST 10 MINUTES that cause HEAVY sweating or LARGE increases in breathing or heart rate?"

Smoking. Smoking was assessed with one continuous item: "During the past 30 days, how many days did you use cigarettes, e-cigarettes, or smokeless tobacco products?". Frequency of smoking was chosen rather than amount because e-cigarettes are consumed at different frequencies than cigarettes.

Alcohol Consumption. Alcohol consumption was measured with one continuous item to assess drinking frequency. All items focus on the last 30 days, and a sample item includes

"DURING THE PAST 30 DAYS, how many days did you drink at least one (1) alcoholic beverage?"

2.2.3 Affective Outcomes

Job satisfaction. Job satisfaction was measured with a three-item scale ($\propto$ = .84; Cammann, Fichman, Jenkins, & Klesh, 1983). Each item has a range from 1 "Strongly Disagree" to 5 "Strongly Agree," and a sample item is "In general, I like working here."

2.2.4 Individual Differences

Health Motivation. Health motivation was assessed using Moorman's (1990) eight item health motivation scale ($\propto$ = .82). Each item has a Likert range from 1 "Strongly Disagree" to 7 "Strongly Agree." The measure has two subscales, preventative orientation and curative orientation. Preventative orientation is the extent to which individuals proactively prevent health consequences from emerging (sample item: "I am concerned about health hazards and try to take action to prevent them"), and curative orientation is the extent to which individuals manage active health symptoms (sample item: "I don't take any action against health hazards I hear about until I know I have a problem").

Demographics. Participants were asked about their age, sex, and nationality. Because tenure has been linked to organizational culture (Bezrukova et al., 2012), participants also provided information regarding how long they worked for the organization, their team, and their department. Last, participants indicated the percentage that they worked face-to-face with members of their team and department, as proximity to others is theorized to be important for alignment on culture (Chao & Moon, 2005).

2.3 Design

Due to this study's design relying on primarily one self-report survey administered at one time point, common method bias (CMB) may be a concern (Podsakoff et al., 2003; Podsakoff, MacKenzie, & Podsakoff, 2012; Podsakoff & Organ, 1986). Although empirical evidence challenges the notion that CMB always upwardly biases results (Spector, 2006), proactive steps were taken to mitigate its potential effects. First, though participants completed the majority of measures, the worksite work environment was assessed at a different time point by HR representatives. In addition, as recommended by Conway and Lance (2010), I also counterbalanced and controlled for the order of the sections of the survey. These sections include the team-level questions (team health culture), department-level questions (department health culture), and individual-level questions (health motivation, job satisfaction, and health behaviors). Moreover, the order of the individual-level questions was randomized to prevent any systematic priming effects. Demographic questions were always asked last. Though these strategies may have not fully eliminated the deleterious effects of CMB, they should have greatly minimized its impact.

2.4 Procedure

The survey and study consent form were emailed to all employees by members in Company Y's executive team and was open from November 11th, 2019 through November 26th, 2019. All measures except for the CDC Health ScoreCard for the worksite work environment were administered in the same survey. Four reminder emails were sent out during the survey period, and the organization hosted a small party for the department that had the highest participation rate.

To ensure that participants thought of the same referent for team and department questions, participants were sent a list of all managers and departments in the organization. In the survey, they were instructed to select their manager and department, and they were then instructed to think of others that also belong to those groups. All participants were thanked after they completed the survey.

Initially, all measures were sent out in English. However, due to a low participation rate, all measures were translated into Vietnamese by the organization's in-house translator at the end of the first week. A third-party, certified translation service provider then back-translated the survey. No meaningful differences were found between the original and back-translated versions, and both versions can be found in Appendix C. Once the Vietnamese version of the survey became available, participants were allowed to choose whether to complete the survey in English or Vietnamese. All analyses controlled for survey language.

The organization also received a report with aggregated survey data for their future health initiatives. Senior leadership was encouraged to share the findings with their employees. No individual or easily identifiable data was shared with members of the organization.

CHAPTER 3: RESULTS

All analyses were performed in R (R Core Team, 2018). Multilevel models were created using lmerTest and lme4 packages (Bates, Maechler, Bolker, & Walker, 2015). All model estimates were generated using restricted maximum likelihood (REML), as these estimates tend to be less biased than those generated by maximum likelihood (ML) for multilevel models; unlike ML estimates, REML estimates also take into consideration the number of parameters in the model (Manor & Zucker, 2004). In contrast, as recommended by Snijders and Bosker (2012), model *comparisons* must be made using ML, not REML, as the theory behind log likelihood ratio testing is built upon ML.

Because most of the dependent variables were measured with single items, missing data in these responses reduced sample sizes for these research questions. Thus, to account for missing data, all analyses were conducted using the raw data as well as five complete datasets generated through multiple imputation (MI) using the mice and miceadds packages (van Buuren & Groothuis-Oudshoorn, 2011). Unlike single imputation methods, MI produces unbiased estimates by using all non-missing values to predict possible values for the missing data. Rather than settling on one value, MI samples these possible values from a normal distribution of possible options and generates multiple datasets. Once the datasets have been generated, all analyses are performed across each dataset, and the results are pooled together to give one response (Graham, 2009). By running analyses on both the raw and imputed datasets, some of the concern that null effects exist due to decreases in power due to missingness or that significant effects are the results of random chance can be mitigated. For the majority of analyses, the raw and imputed datasets yielded similar results. Because the decision to

use MI was made post-hoc, all analyses reported in this dissertation use the raw data. However, when the results between the raw and imputed datasets show meaningful differences,[4] the results from the imputed datasets are reported in footnotes.

Most analyses faced problems with singularity when both team and department were included as random effects. Singularity occurs when a random effect has a variance of zero, resulting in the model failing to converge. When a singular fit occurs, Bates and colleagues (2015) recommend making the model more parsimonious to avoid the deleterious effects of singularity. Rather than dropping random effect terms spuriously, restricted likelihood ratio tests (RLRTs) should be conducted on each random effect to test if its variance is significantly different than zero (Greven, Crainiceanu, Küchenhoff, & Peters, 2009). RLRT accomplishes this feat by running the data and model through a predetermined number of simulations and examines if the variance of the random effect differs significantly from zero across the simulations (Crainiceanu & Ruppert, 2004). In this study, the exactRLRT function from the RLRsim package was used with each random effect and criterion variable with 10000 simulations (Greven et al., 2009). Across all health criterion variables, department membership did not differ significantly from zero, and because even some of the intercept-only models failed to converge when department membership was added as a random effect, it was dropped from all health models. Similarly, the variance of team membership failed to differ from zero except for vigorous physical activity (RLRT = 3.15, p = .03). Thus, to maintain consistency across all health-focused models, all models include team membership as a Level 2 random

[4] A "meaningful" difference would include key variables becoming or losing their significance but would not include minor changes to the model estimates or control variables losing or becoming significant.

effect. Even with this modification, however, all models predicting fruit consumption and alcohol consumption remained singular, as did the model predicting light exercise when employees' health motivation was added alongside team and department weight maintenance culture. For these models, multiple linear regression was used. Despite not accounting for the nested structure for these models, the results for these analyses were still the same as the singular multilevel models were very similar, as would be expected when a grouping variable accounts for zero variance (Bates et al., 2015).

In contrast to the models predicting health behaviors, both team membership (RLRT = 3.15, p = .03) and department membership (RLRT = 3.15, p = .03) had variances significantly different from zero when predicting job satisfaction. Thus, for this model, both team (Level 2) and department membership (Level 3) were added as random effect models. The results of all of RLRT tests can be found in Table 1.

Table 1
Restricted Likelihood Ratio Tests

Dependent Variable	Team Membership		Department Membership	
	RLRT	*p*	RLRT	*p*
Vigorous Exercise	3.15	.03*	1.39	.09
Light Exercise	1.46	.11	0.06	.36
Fruit Consumption	> 0.01	.47	> 0.01	.45
Veg Consumption	0.50	.22	> 0.01	1
Alc Consumption	> 0.01	.45	> 0.01	.45
Smoking	.19	.31	> 0.01	.45
Job Satisfaction	7.19	.003*	4.62	.01*

Hypothesis 1 postulated that team and department health culture are distinct. This hypothesis was tested in two ways. First, correlations at the employee level between the facets of team and department health culture were analyzed. Correlations ranged from .60 to .82. According to Cohen (1988), correlations of about .50 are considered large. Thus,

though department and team health cultures are not perfectly overlapping, they nonetheless strongly relate to each other. These results provide mixed support for Hypothesis 1. Descriptive statistics and Cronbach's Alphas for all variables are documented in Table 2. Due to the large number of variables in the study, correlations among all variables are divided into five tables for readability and can be found in Tables 3 through 7. Internal consistencies exceed traditional cutoffs of .7 for all measures except for antismoking culture and job satisfaction (Nunnally & Bernstein, 1994). For these scales, coefficient omega was also conducted (McDonald, 1999). Coefficient omega makes more realistic assumptions of the data; for instance, not all items must maintain tau-equivalence (Dunn, Baguley, & Brunsden, 2014). The reliabilities of all scales increased modestly. The omegas for team antismoking culture, department antismoking culture, and job satisfaction were .68, .66, and .71, respectively.

Table 2
Descriptive Statistics and Reliabilities

Variables	*M*	*SD*	Range	Alpha
Team				
HC	3.65	0.52	1 - 5	.89
WMC	3.65	0.61	1 - 5	.92
ASC	3.91	0.79	1 - 5	.62
RDC	3.41	0.82	1 - 5	.82
Department				
HC	3.60	0.51	1 - 5	.89
WMC	3.67	0.62	1 - 5	.93
ASC	3.79	0.76	1 - 5	.63
RDC	3.25	0.80	1 - 5	.81
Health Motivation	5.02	0.94	1 - 7	.77
Vigorous Physical Activity+	2.65	1.17	1 - 5	-
Light Physical Activity+	2.73	1.21	1 - 5	-
Fruit Consumption+	2.27	0.80	1 - 5	-
Veg. Consumption+	2.77	0.86	1 - 5	-
Alc. Consumption+	3.31	5.87	0 - 30	-
Smoking	1.43	5.77	0 - 30	-
Job Satisfaction	4.15	0.72	1 - 5	.68

Note: * = $p < .05$; HC = Health Culture, WMC = Weight Maintenance Culture, RDC = Responsible Drinking Culture, ASC = Antismoking Culture, Veg = Vegetable, Alc = Alcohol; Physical activity items asked how many frequency of activity/week, diet items asked about how many servings/day, and alcohol and smoking asked how many times in the last 30 days did the individual engage in the behavior; + Cronbach's alpha is not available for these variables, as they were measured with only one item

Table 3
Correlations among Independent and Dependent Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team																
1. HC	-															
2. WMC	.88*	-														
3. RDC	.60*	.23*	-													
4. ASC	.65*	.34*	.40*	-												
Dept																
5. HC	.79*	.73*	.44*	.48*	-											
6. WMC	.71*	.81*	.15	.32*	.87*	-										
7. RDC	.44*	.18*	.74*	.26*	.53*	.12	-									
8. ASC	.49*	.32*	.30*	.61*	.63*	.29*	.40*	-								
9. HM	.33*	.24*	.30*	.24*	.27*	.17*	.26*	.22*	-							
10. Vig Ex	.16*	.20*	-.02	.09	.11	.15*	-.05	.06	.22*	-						
11. Lite Ex	.15*	.16*	.04	.09	.17*	.24*	-.04	.03	.22*	.74*	-					
12. Fr Con	.10	.14	.04	-.05	.08	.18*	-.09	-.09	.03	.14*	.14*	-				
13. Vg Con	.16*	.16*	.07	.08	.09	.16*	-.06	-.01	.15*	.19*	.21*	.53*	-			
14. Al Con	-.09	.01	-.17*	-.14	-.06	.02	-.18*	-.06	-.15*	0	0	.05	-.05	-		
15. Smoke	-.14*	-.05	-.15	-.17*	-.12	-.10	-.03	-.12	-.22*	-.02	-.02	.06	-.03	.31*	-	
16. Job Sat	.34*	.34*	.08	.26*	.35*	.38*	0	.24*	.26*	.16*	.15*	-.01	.05	.02	-.14*	-

Note: * = $p < .05$; HC = Health Culture, WMC = Weight Maintenance Culture, RDC = Responsible Drinking Culture, ASC = Antismoking Culture, HM = Health Motivation, Vig Ex = Vigorous (Aerobic) Exercise, Lite Ex = Light Exercise, Fr Con = Fruit Consumption, Vg Con = Vegetable Consumption, Al Con = Alcohol Consumption, Smoke = Number of Days Consuming Cigarettes/Using E-Cigarettes in the Past 30 Days, Job Sat = Job Satisfaction

Table 4

Correlations among Independent Individual-Level and Team-Level Variables and Controls

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Team												
1. HC	-											
2. WMC	.88*	-										
3. RDC	.60*	.23*	-									
4. ASC	.65*	.34*	.40*	-								
5. IA-HC	-.03	-.05	-.05	.08	-							
6. IA-WMC	.06	.10	-.08	.04	.73*	-						
7. IA-RDC	-.09	-.17*	.12	-.03	.43*	-.11	-					
8. IA-ASC	.10	.05	.10	.14*	.49*	.16*	.17*	-				
9. T-HM	.21*	.18*	.19*	.09	-.18*	-.23*	.10	-.06	-			
10. Team Size	-.13	-.08	-.07	-.17*	-.03	.06	.03	-.17*	.05	-		
11. HM	.33*	.24*	.30*	.24*	-.11	-.14	.06	-.04	.58*	.04	-	
12. Lang	.13	.17*	.08	-.06	-.22*	-.16*	-.07	-.07	.18*	-.05	.25*	-

Note: * = $p < .05$; All correlations shown are at the individual level; HC = Health Culture, WMC = Weight Maintenance Culture, RDC = Responsible Drinking Culture, ASC = Antismoking Culture, IA = Interrater Agreement (as measured by z-scored rwg(j) statistics), T-HM = Health Motivation by Team, HM = Employee Health Motivation; Lang = Survey Language (0 = English, 1 = Vietnamese)

Table 5

Correlations among Independent Individual-Level and Department-Level Variables and Controls

Variables	1	2	3	4	5	6	7	8	9	10	11	12
Dept												
1. HC	-											
2. WMC	.87*	-										
3. RDC	.53*	.12	-									
4. ASC	.63*	.29*	.40*	-								
5. IA-HC	0	-.08	.16*	0	-							
6. IA-WMC	.01	-.02	.08	-.03	.87*	-						
7. IA-RDC	-.07	-.13*	.14*	-.05	.65*	.31*	-					
8. IA-ASC	.05	-.04	.17*	.11	.86*	.66*	.40*	-				
9. D-HM	.17*	-.01	.34*	.21*	.14*	-.01	.20*	.17*	-			
10. Team Size	-.10	-.06	-.07	-.11	-.01	.04	-.09	-.01	-.03	-		
11. HM	.27*	.17*	.26*	.22*	.05	-.01	.07	.07	.42*	.04	-	
12. Lang	.17*	.14*	.18*	.01	.06	.08	.04	.01	.16*	-.05	.25*	-

Note: * = $p < .05$; All correlations shown are at the individual level; HC = Health Culture, WMC = Weight Maintenance Culture, RDC = Responsible Drinking Culture, ASC = Antismoking Culture, IA = Interrater Agreement (as measured by z-scored rwg(j) statistics), D-HM = Health Motivation by Department, HM = Employee Health Motivation; Lang = Survey Language (0 = English, 1 = Vietnamese)

Table 6

Correlations among Dependent Variables and Individual-Level and Team-Level Controls

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Lite Ex	-													
2. Vig Ex	.74*	-												
3. Fr Con	.14*	.14*	-											
4. Vg Con	.19*	.21*	.53*	-										
5. Al Con	0	0	.05	-.05	-									
6. Smoke	-.02	-.02	.06	-.03	.31*	-								
7. Job Sat	.16*	.15*	-.01	.05	.02	-.14*	-							
Team														
8. IA-HC	-.04	-.10	-.03	-.03	.04	.05	0	-						
9. IA-WMC	0	-.08	0	-.03	0	.06	.04	.73*	-					
10. IA-RDC	-.06	-.02	-.10	-.09	.01	.05	-.05	.43*	-.11	-				
11. IA-ASC	.05	.05	-.02	0	.19*	.18*	-.03	.49*	.16*	.17*	-			
12. T-HM	.20*	.22*	-.03	.13	-.05	-.02	.13	-.18*	-.23*	.10	-.06	-		
13. Team Size	.03	.06	-.05	0	-.11	-.08	-.09	-.03	.06	.03	-.17*	.05	-	
14. Lang	.04	.06	-.10	-.06	-.15*	-.12	-.03	-.22*	-.16*	-.07	-.07	.18*	-.05	-

Note: * = $p < .05$; All correlations shown are at the individual level; Lite Ex = Light Exercise, Vig Ex = Vigorous (Aerobic) Exercise, Fr Con = Fruit Consumption, Vg Con = Vegetable Consumption, Al Con = Alcohol Consumption, Smoke = Number of Days Consuming Cigarettes/Using E-Cigarettes in the Past 30 Days, Job Sat = Job Satisfaction, IA = Interrater Agreement (as measured by z-scored rwg(j) statistics), HC = Health Culture, WMC = Weight Maintenance Culture, RDC = Responsible Drinking Culture, ASC = Antismoking Culture, T-HM = Health Motivation by Team, Lang = Survey Language (0 = English, 1 = Vietnamese)

Table 7

Correlations among Dependent Variables and Individual-Level and Department-Level Controls

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Lite Ex	-													
2. Vig Ex	.74*	-												
3. Fr Con	.14*	.14*	-											
4. Vg Con	.19*	.21*	.53*	-										
5. Al Con	0	0	.05	-.05	-									
6. Smoke	-.02	-.02	.06	-.03	.31*	-								
7. Job Sat	.16*	.15*	-.01	.05	.02	-.14*	-							
Dept														
8. IA-HC	-.08	-.07	-.07	-.05	-.20*	-.03	-.02	-						
9. IA-WMC	-.08	-.04	-.06	-.07	-.16*	-.01	-.02	.87*	-					
10. IA-RDC	-.07	-.09	-.09	-.05	-.13*	-.05	-.01	.65*	.31*	-				
11. IA-ASC	-.05	-.05	-.02	0	-.18*	-.02	0	.86*	.66*	.40*	-			
12. D-HM	.14*	.14*	.01	.11	-.12	-.09	0	.14*	-.01	.20*	.17*	-		
13. Team Size	.03	.06	-.05	0	-.11	-.08	-.09	-.01	.04	-.09	-.01	-.03	-	
14. Lang	.04	.06	-.10	-.06	-.15*	-.12	-.03	.06	.08	.04	.01	.16*	-.05	-

Note: * = $p < .05$; All correlations shown are at the individual level; Lite Ex = Light Exercise, Vig Ex = Vigorous (Aerobic) Exercise, Fr Con = Fruit Consumption, Vg Con = Vegetable Consumption, Al Con = Alcohol Consumption, Smoke = Number of Days Consuming Cigarettes/Using E-Cigarettes in the Past 30 Days, Job Sat = Job Satisfaction, IA = Interrater Agreement (as measured by z-scored rwg(j) statistics), HC = Health Culture, WMC = Weight Maintenance Culture, RDC = Responsible Drinking Culture, ASC = Antismoking Culture, D-HM = Health Motivation by Department, Lang = Survey Language (0 = English, 1 = Vietnamese)

Next, Hypothesis 1 was also tested by trying to replicate past findings linking health culture to physical activity (Sliter, 2013) and healthy diet choices (Sonnentag et al., 2017). To test these relationships, a model comparison approach was adopted. First, an intercept-only model was created with team membership as a random effect predicting the respective criterion variable.[5] Next, all control variables were added to the model. For physical activity, the control variables include CDC Health ScoreCard scores for the physical activity and weight management aspects of the employees' worksite, the number of members in a team, the interrater agreement about the culture for the team and department, the number of hours that employees worked face-to-face with members from their team and department, the language of the survey, and the order that participants completed the survey. Diet behaviors shared the same control variables except the CDC Health ScoreCard scores for nutrition policies at the employees' worksite replaced the physical activity policies.

Interrater agreement for all facets of team and department health culture were established using rwg(j) (James, Demaree, & Wolf, 1993). Following the example and recommendations of past researchers (Chan, 2014; Luria, 2008), I treated interrater agreement as a control rather than setting an arbitrary cutoff for sufficient agreement. Though antismoking culture had lower interrater agreement at both the team (M = .59; SD = .34) and department levels (M = .56; SD = .22), the average agreement was extremely high for overall health culture (team: M = .97; SD = .02; department: M = .96; SD = .01) and weight maintenance culture (team: M = .96; SD = .04; department: M =

[5] For fruit consumption, the intercept-only model contained no variables, as the model became singular when team membership was added as a random effect.

.96; *SD* = .01). The average interrater agreement of responsible drinking culture also exceeded traditional cutoffs of .70 (team: *M* = .74; *SD* = .28; department: *M* = .79; *SD* = .11). As rwg(j) scores are partially influenced by the number of items in a scale (James, Demaree, & Wolf, 1984), this pattern makes sense, as the entire health culture measure consisted of 33 items, 20 of which belonged to the weight maintenance subscale and only six and seven belonging to the antismoking and responsible drinking subscales, respectively. Further inspection of the distribution of the rwg(j) scores also shows that the interrater agreement for antismoking culture was largely bimodal. Most groups either had high agreement on the antismoking culture or almost no agreement. One post-hoc explanation may be that, when employees have a mix of smokers and nonsmokers in their team or department, they may not know how to respond to the survey, as no one answer applies to all members. Nonetheless, after calculating rwg(j) scores for each team and department, they were z-scored to increase variability to account for any potential effects of differential agreement (Bond Jr. & Richardson, 2004; Fisher, 1915).

After creating the model with each control variable, it was compared to the intercept-only model. If it was significantly better, then all control variables were retained. If the models were not significantly different but the control model contained at least one significant predictor, then a reduced model that only contained the significant controls was compared to the intercept-only model. If that reduced model outperformed the intercept-only model, then it was used for all subsequent analyses.

Next, the team and department weight maintenance cultures were added independently to the current model and compared either to the intercept-only or control model. The final model contained the weight maintenance cultures at both the team and

department levels. For all analyses, team and department health culture were grand mean centered (Hofmann & Gavin, 1998), so the data will be interpreted at the individual level rather than as relative to other participants' teams or departments.

Tables 8 and 9 display the model estimates and model comparison results for vigorous and light physical activity, respectively. For vigorous physical activity, the only significant control variable was question order, $\gamma = -.77$, $t(150.33) = -2.34$, $p = .02$; however, this model failed to account for more variance than the intercept-only model, $\chi_2(5) = 3.46$, $p = .23$, and was not included in other models. Team weight maintenance culture significantly predicted vigorous physical activity in team-only model, $\gamma = .73$, $t(64.27) = 3.11$, $p = .003$, as well as the final model that included team and department weight maintenance culture, $\gamma = .67$, $t(70.27) = 2.68$, $p = .009$. In addition, team weight maintenance culture significantly predicted light physical activity in the team-only model, $\gamma = .50$, $t(58.49) = 2.09$, $p = .04$, but not the final model containing it and department weight maintenance culture, $\gamma = .45$, $t(62.28) = 1.78$, $p = .08$. In contrast, department weight maintenance culture did not significantly relate to vigorous, $\gamma = .56$, $t(133.20) = 1.64$, $p = .10$, or light physical activity, $\gamma = .44$, $t(124.45) = 1.25$, $p = .21$. Thus, for vigorous physical activity, the best fitting model included only team weight maintenance culture, and for light physical activity, the best model included team weight maintenance culture and the worksite's physical activity and weight maintenance health environment.

Table 8

Multilevel Estimates for Model Predicting Employee Vigorous (Cardiovascular) Physical Activity

	Null model			*Control Only*			*Team WMC*			*Dept WMC*			*Team & Dept WMC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.67	0.10	25.79*	3.47	4.04	0.86	2.66	0.09	28.06*	2.67	0.10	26.16*	2.66	0.10	27.89*
Controls															
Block Order				-0.77	0.33	-2.34*									
Language				0.21	0.21	1.00									
IA, Team				-0.12	0.29	-0.42									
IA, Dept				0.11	0.75	0.15									
Team Size				0	0.01	0.11									
Hrs, Team				-0.02	0.05	-0.40									
Hrs, Dept				-0.03	0.06	-0.48									
PA & WM HE				-0.01	0.20	-0.03									
Team WMC							0.73	0.24	3.11*				0.67	0.25	2.68*
Dept WMC										0.56	0.34	1.64	0.27	0.35	0.77
Log Likelihood	-262.44			-258.98			-257.88			-261.08			-257.58		
AIC	530.88			533.96			523.75			530.16			525.16		
BIC	540.27			559.00			536.27			542.68			540.81		
Δ Log Likelihood (*df*) to Null				3.46 (5) *ns*			4.56 (1) *			1.36 (1) *ns*			4.86 (2) *		
Δ Log Likelihood (*df*) to Control^							1.10 (-4) *			-2.10 (4) *ns*			2.10 (4) *ns*		
Δ Log Likelihood (*df*) to Team WMC										-			0.30 (1) *ns*		
Δ Log Likelihood (*df*) to Dept WMC													3.50 (1) *		
Level 2 Intercept Variance (*SD*)	0.19(0.44)			0.31(0.55)			0.10(0.32)			0.18(0.42)			0.11(0.33)		

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, PA & WM HE = Physical Activity and Weight Maintenance Health Environment; N_{Emp} = 169, N_{Team} = 58, N_{Dept} = 33

Table 9

Multilevel Estimates for Model Predicting Employee Light Physical Activity

	Null model			*Control Only*			*Team WMC*			*Dept WMC*			*Team & Dept WMC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.72	0.10	26.20*	12.02	4.00	3.00*	10.14	3.57	2.84*	10.20	3.66	2.79*	9.73	3.62	2.69*
Controls															
Block Order				-0.07	0.34	-0.22									
Language				0.18	0.22	0.80									
IA, Team				0.09	0.27	0.33									
IA, Dept				-.74	0.75	-0.99									
Team Size				0	0.01	-0.33									
Hrs, Team				0.01	0.06	0.18									
Hrs, Dept				0.01	0.06	0.10									
PA & WM HE				-0.41	0.20	-2.03*	-0.37	0.18	-2.09*	-0.38	0.18	-2.05*	-0.35	0.18	-1.94
Team WMC							0.50	0.24	2.09*				0.45	0.25	1.78
Dept WMC										0.44	0.35	1.25	0.25	0.36	0.68
Log Likelihood	-269.65			-267.03			-264.84			-266.23			-264.58		
AIC	545.30			542.06			539.68			542.45			541.17		
BIC	554.69			554.58			555.33			558.10			559.95		
Δ Log Likelihood (*df*) to Null				2.62 (1) *			4.81 (2) *			3.42 (2) *			5.07 (3) *		
Δ Log Likelihood (*df*) to Control^							2.19 (1) *			0.80 (1) *ns*			2.45 (2) *ns*		
Δ Log Likelihood (*df*) to Team WMC										-			0.26 (1) *ns*		
Δ Log Likelihood (*df*) to Dept WMC													1.65 (1) *ns*		
Level 2 Intercept Variance (*SD*)	0.15(0.38)			0.12(0.35)			0.04(0.22)			0.07(0.26)			0.04(0.21)		

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, PA & WM HE = Physical Activity and Weight Maintenance Health Environment; N_{Emp} = 169, N_{Team} = 58, N_{Dept} = 33

For both diet behaviors, no model outperformed the intercept-only model. Both team weight maintenance culture, $b = -0.07$, $t(167) = -0.52$, $p = .61$, and department weight maintenance culture, $b = .11$, $t(167) = 0.62$, $p = .54$, failed to predict fruit consumption. Similarly, team weight maintenance culture, $\gamma = .07$, $t(56.44) = 0.42$, $p = .68$, and department weight maintenance culture, $\gamma = .24$, $t(115.14) = 0.97$, $p = .34$, failed to predict vegetable consumption. Tables 10 and 11 contain all model estimates and model comparisons for models predicting fruit and vegetable consumption, respectively.

In sum, these results provide mixed support for Hypothesis 1 that health cultures at different levels are distinct. The correlations show that they are strongly related. When modeled together to predict light physical activity, team weight maintenance culture loses its significance and department weight maintenance culture remains non-significant. Furthermore, neither level of weight maintenance culture predicted fruit or vegetable consumption. Nonetheless, for vigorous physical activity, team weight maintenance culture predicts above and beyond department weight maintenance culture, $\gamma = .67$, $t(70.27) = 2.68$, $p = .009$, showing that health cultures across levels can exert differential effects.

Hypotheses 2 and 3 follow the same model comparison approach used for Hypothesis 1. Hypothesis 2 states that team and department responsible drinking culture will negatively relate to employee alcohol consumption. Two control variables outperformed the intercept-only model and were included in all subsequent models. Participants who took the survey in Vietnamese ($M = 2.44$, $SD = 4.54$) reported drinking significantly less frequently than individuals who took the survey in English ($M = 4.19$,

SD = 6.87), *b* = -2.33, *t*(148) = -2.21, *p* = .03; however, survey language lost its significance in all models beyond the control only model. Similarly, being a member of a larger team negatively related to participants' frequency of drinking, *b* = -0.10, *t*(148) = -2.10, *p* = .04. With these variables added to the regression with the raw data, neither team responsible drinking culture, *b* = -1.41, *t*(157) = -1.78, *p* = .07, nor department responsible drinking culture, *b* = -1.02, *t*(157) = -1.08, *p* = .28, predicted employee alcohol consumption, and these null effects persisted even when responsible drinking cultures are the only variables in the model. Table 12 highlights the regression weights and results from the model comparisons for alcohol consumption.[6] As neither team nor department responsible drinking culture predicted alcohol consumption, these data fail to support Hypothesis 2.

[6] Despite these null findings using the raw data, the imputed datasets yield different results, as shown in Table 13. With the imputed datasets, survey language, *b* = -1.40, *t*(165.26) = -1.47, *p* = .14, and team size, *b* = -0.08, *t*(175.96) = -1.59, *p* = .11, no longer significantly relate to alcohol consumption. Moreover, though the number of hours that employees spend with their team members, *b* = -0.53, *t*(181.97) = -2.16, *p* = .03, and department members, *b* = -0.66, *t*(159.76) = 2.36, *p* = .02, do become significant, they fail to outperform the intercept-only model. In addition, team responsible drinking culture, *b* = -1.60, *t*(196.20) = -2.08, *p* = .03, and department responsible drinking culture, *b* = -1.94, *t*(260.65) = -2.48, *p* = .01, now negatively predict employee alcohol consumption. This change in significance may be due to a lack of power in the raw dataset to detect an effect, as a large number of participants were dropped from analyses due to missing at least one of the variables. Though analyses for alcohol consumption performed on the raw dataset contained 161 participants, 58 teams, and 34 departments, the imputed datasets retained all 282 participants, 63 teams, and 39 departments. Furthermore, although department responsible drinking culture (*p* = .28) in the raw dataset was far from traditional significance cutoffs, team responsible drinking culture was near significant (*p* = .07). However, despite team and department responsible drinking cultures' significance as main effects, when modeled together, both become nonsignificant again.

Table 10

Estimates for Model Predicting Employee Fruit Consumption

	Null model			*Control Only*			*Team WMC*			*Dept WMC*			*Team & Dept WMC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.18	0.05	43.57*	3.09	0.83	3.74*	2.18	0.05	43.46*	2.18	0.05	43.49*	2.18	0.05	43.43*
Controls															
Block Order				-0.02	0.19	-0.08									
Language				-0.15	0.12	-1.27									
IA, Team				-0.01	0.14	-0.07									
IA, Dept				-0.37	0.40	-0.93									
Team Size				-0.01	0.01	-1.05									
Hrs, Team				-0.01	0.03	0.52									
Hrs, Dept				0.02	0.40	-0.93									
Nut & WM HE				-0.03	0.02	-1.50									
Team WMC							-0.07	0.13	-0.52				-0.11	0.14	-0.77
Dept WMC										0.11	0.18	0.62	0.17	0.20	0.84
RSS		71.31			67.32			71.20			71.15			70.90	
Log Likelihood		-167			-162			-167			-167			-166	
AIC		338			352			340			339			341	
BIC		344			396			349			349			353	
Δ RSS (*df*) to Null					3.99 (12) *ns*			0.11 (1) *ns*			0.16 (1) *ns*			0.41 (2) *ns*	
Δ RSS (*df*) to Team WMC											-			0.30 (1) *ns*	
Δ RSS (*df*) to Dept WMC														0.25 (1) *ns*	

Note: Due to singularity issues, this model used multiple regression instead of multilevel modeling; however, all coefficients in both models were within two decimal places of each other. * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, Nut & WM HE = Nutrition and Weight Maintenance Health Environment; Because no significant control variables emerged, no models were compared to the control model beyond the null model; $N_{Emp} = 169$, $N_{Team} = 58$, $N_{Dept} = 33$

Table 11

Multilevel Estimates for Model Predicting Employee Vegetable Consumption

	Null model			*Control Only*			*Team WMC*			*Dept WMC*			*Team & Dept WMC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.74	0.07	39.41*	2.89	1.12	2.58*	2.75	0.07	39.04*	2.75	0.07	39.64*	2.75	0.07	39.22*
Controls															
Block Order				-0.11	0.25	-0.45									
Language				-0.11	0.16	-0.67									
IA, Team				-0.08	0.19	-0.41									
IA, Dept				-0.03	0.53	-0.05									
Team Size				0	0.01	-0.12									
Hrs, Team				0.03	0.04	0.62									
Hrs, Dept				0	0.05	-0.05									
Nut & WM HE				0.01	0.02	0.21									
Team WMC							0.07	0.18	0.42				0.02	0.19	0.12
Dept WMC										0.24	0.24	0.97	0.22	0.26	0.87
Log Likelihood		-209.66			-208.05			-209.57			-209.18			-209.17	
AIC		425.32			446.10			427.14			426.35			428.34	
BIC		434.71			493.04			439.66			438.87			443.99	
Δ Log Likelihood (*df*) to Null					1.61 (12) *ns*			0.09 (1) *ns*			0.48 (1) *ns*			0.49 (2) *ns*	
Δ Log Likelihood (*df*) to Team WMC											-			0.40 (1) *ns*	
Δ Log Likelihood (*df*) to Dept WMC														0.01 (1) *ns*	
Level 2 Intercept Variance (*SD*)		0.04(0.21)			0.06(0.24)			0.05(0.22)			0.04(0.20)			0.05(0.21)	

Note: * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, Nut & WM HE = Nutrition and Weight Maintenance Health Environment; Because no significant control variables emerged, no models were compared to the control model beyond the null model; N_{Emp} = 169, N_{Team} = 58, N_{Dept} = 33

Table 12

Estimates for Model Predicting Employee Alcohol Consumption

	Null model			*Control Only*			*Team RDC*			*Dept RDC*			*Team & Dept RDC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	3.14	0.45	6.96*	9.14	5.78	1.58*	5.30	0.90	5.86*	5.22	0.91	5.74*	5.29	0.91	5.83*
Controls															
Block Order				1.82	1.70	1.07									
Language				-2.33	1.05	-2.21*	-1.72	0.89	-1.94	-1.70	0.90	-1.90	-1.70	0.89	-1.91
IA, Team				-0.49	0.76	-0.65									
IA, Dept				-3.39	2.01	-1.69									
Team Size				-0.10	0.05	-2.10*	-0.10	0.05	-2.04*	-0.09	0.05	-1.86	-0.10	0.05	-2.03*
Hrs, Team				-0.27	0.28	-0.96									
Hrs, Dept				0.49	0.31	1.58									
GOS HE				-0.07	0.26	-0.25									
Team RDC							-1.41	0.79	-1.79				-1.33	0.94	-1.41
Dept RDC										-1.02	0.94	-1.08	-0.18	1.11	-0.16
RSS	5237.00			5006.70			4907.80			4969.90			4907.00		
Log Likelihood	-509			-493			-504			-505			-504		
AIC	1022			1017			1017			1019			1019		
BIC	1028			1063			1032			1034			1038		
Δ RSS (*df*) to Null				230.30 (2) *			329.2 (3) *			267.10 (3) *			330 (4) *		
Δ RSS (*df*) to Control^							98.90 (1) *ns*			36.80 (1) *ns*			99.70 (2) *ns*		
Δ RSS (*df*) to Team RDC										-			0.80 (1) *ns*		
Δ RSS (*df*) to Dept RDC													62.90 (1) *ns*		

Note: Due to singularity issues, this model used multiple regression instead of multilevel modeling; however, all coefficients in both models were within two decimal places of each other. * $p < .05$; ^ Control model comparisons are shown only for significant variables; RDC = Responsible Drinking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, GOS HE = General Organizational Support Health Environment; N_{Emp} = 161, N_{Team} = 58, N_{Dept} = 34

Table 13

Estimates for Model Predicting Employee Alcohol Consumption with Multiple Imputation

	Null model			*Control Only*			*Team RDC*			*Dept RDC*			*Team & Dept RDC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	3.30	0.35	9.32*	8.48	5.70	1.49	3.42	0.43	8.01*	3.25	0.35	9.21*	3.28	0.42	7.71*
Controls															
Block Order				1.83	1.64	1.12									
Language				-1.40	0.95	-1.47									
IA, Team				-0.21	0.71	-0.30									
IA, Dept				-2.29	1.86	-1.23									
Team Size				-0.08	0.05	-1.59									
Hrs, Team				-0.53	0.25	-2.16*									
Hrs, Dept				0.66	0.28	2.36*									
GOS HE				-0.12	0.26	-0.47									
Team RDC							-1.60	0.77	-2.08*				-1.46	0.88	-1.65
Dept RDC										-1.94	0.78	-2.48*	-0.43	1.07	-0.40
Δ Log Likelihood (*df*) to Null+					*ns*			*			*			*ns*	
Δ Log Likelihood (*df*) to Control^+								-			-			-	
Δ Log Likelihood (*df*) to Team RDC+											-			*ns*	
Δ Log Likelihood (*df*) to Dept RDC+														*ns*	

Note: Due to singularity issues, this model used multiple regression instead of multilevel modeling; however, all coefficients in both models were within two decimal places of each other. * $p < .05$; ^ Control model comparisons are shown only for significant variables; RDC = Responsible Drinking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, GOS HE = General Organizational Support Health Environment; $N_{Emp} = 282$, $N_{Team} = 63$, $N_{Dept} = 39$; + models were compared using log likelihood testing; however, because the datasets were generated using multiple imputation, R was only provided the significance between the models without providing the exact log likelihood for each value. Some models could not be compared because they were not contained within previous models.

Hypothesis 3 stated the team and department antismoking culture will negatively relate to employee smoking behaviors. As evinced in Table 14, no model outperformed the intercept-only model, and neither team antismoking culture, $\gamma = -0.38$, $t(62.54) = -0.42$, $p = .67$, nor department antismoking culture, $\gamma = 0.22$, $t(65.55) = 0.24$, $p = .81$, were significant predictors of smoking behaviors. This result is unsurprising given that, of the 282 participants, only 14 identified as smokers. Thus, though the data clearly fail to support Hypothesis 3, this null finding may be due to the sample under investigation.

Hypothesis 4 postulated that employees' health motivation would moderate the effects of team and department health culture on their physical activity, diet, alcohol, consumption, and smoking behaviors. The initial model started with the intercept-only model followed by adding in any significant control variables. All the same control variables were used as previous analyses in addition to the average health motivation in a team and department. As explained by Preacher and colleagues (2010), individuals exist in one and only one group per level. These groups differ between each other, but members *within* each group also differ from each other. To control for this within group variability of health motivation, the average of each teams and departments' members' health motivation are controlled for as fixed effects as well.

The next model added employees' health motivation. The third model included the team and department health cultures as main effects. The final model added the interactions between an individual's health motivation and their team and department health cultures.

The model estimates and results of the model comparison for Hypothesis 4 for vigorous physical activity, light physical activity, fruit consumption, vegetable

consumption, alcohol consumption, and smoking can be found in Tables 15 to 20, respectively.

For vigorous physical activity, the best fitting model included the main effects of health motivation and the significant control variables. It outperformed the null model, χ^2 (9) = 29.84, $p < .001$, and the control-only model that contained aggregated team health motivation and question order, χ^2 (4) = 22.91, $p < .001$. Nevertheless, when employee health motivation, team and department weight maintenance culture were modeled together, both employee health motivation, $\gamma = .24$, $t(107.79) = 2.32$, $p = .02$, and team weight maintenance culture, $\gamma = .52$, $t(66.70) = 2.10$, $p = .04$, significantly predicted employees' frequency of vigorous physical activity, although department weight maintenance culture did not, $\gamma = .16$, $t(120.37) = 0.48$, $p = .63$.[7] However, none of the interaction terms were significant. As such, Hypothesis 4 for vigorous physical activity was not supported.

[7] The results of the model including the main effects of health motivation and weight maintenance culture may need to be accepted cautiously, as when the same models were run using the imputed datasets, team weight maintenance culture no longer significantly predicted vigorous physical activity, $b = 0.40$, $t(191.01) = 1.83$, $p = .07$, unlike health motivation which remained significant, $b = 0.25$, $t(191.01) = 2.44$, $p = .02$. As an aside, when this model was run using the imputed datasets, the model became singular, so multiple linear regression was performed rather than multilevel regression. All model estimates and comparisons for vigorous physical activity using the imputed dataset can be found in Table 21.

Table 14
Multilevel Estimates for Model Predicting Employee Smoking

	Null model			*Control Only*			*Team ASC*			*Dept ASC*			*Team & Dept ASC*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	1.27	0.47	2.68*	6.50	2.40	2.71*	1.27	0.48	2.67*	1.25	0.48	2.59*	1.22	0.49	2.52*
Controls															
Block Order				-3.29	1.61	-2.04*									
Language				-0.10	1.06	-0.10									
IA, Team				0.61	0.35	1.77									
IA, Dept				-0.06	1.76	-0.04									
Team Size				-0.05	0.05	-0.94									
Hrs, Team				-0.15	0.30	-0.51									
Hrs, Dept				-0.36	0.31	-1.13									
Team ASC							-0.38	0.90	-0.42				-0.81	1.14	-0.71
Dept ASC										0.22	0.94	0.24	0.74	1.19	0.62
Log Likelihood		-466.93			-464.29			-466.83			-466.90			-209.17	
AIC		939.85			944.58			941.67			426.35			428.34	
BIC		948.87			968.62			953.68			438.87			443.99	
Δ Log Likelihood (*df*) to Null					2.64 (5) *			0.10 (1) *ns*			0.48 (1) *ns*			0.49 (2) *ns*	
Δ Log Likelihood (*df*) to Control^								-			-			-	
Δ Log Likelihood (*df*) to Team WMC											-			0.40 (1) *ns*	
Δ Log Likelihood (*df*) to Dept WMC														0.01 (1) *ns*	
Level 2 Intercept Variance (*SD*)		1.10(1.05)			1.59(1.26)			1.23(1.11)			1.24(1.11)			1.22(1.11)	

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables; ASC = Antismoking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement; N_{Emp} = 149, N_{Team} = 59, N_{Dept} = 34

Table 15

Multilevel Estimates for Model Predicting Employee Cardiovascular Physical Activity by Health Motivation and Weight Maintenance Culture

	Null model			*Control Only*			*HM Only*			*HM & WMC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.67	0.10	25.79*	1.91	3.87	0.50	1.88	0.59	3.20*	1.83	0.59	3.12*	1.87	0.60	3.12*
Controls															
Block Order				-0.89	0.32	-2.75*	-0.70	0.31	-2.25*	-0.64	0.31	-2.05*	-0.62	0.31	-1.98*
Language				0.16	0.21	0.75									
IA, Team				0.14	0.28	0.50									
IA, Dept				-0.07	0.72	-0.09									
Team Size				0	0.01	-0.34									
Hrs, Team				-0.01	0.05	-0.11									
Hrs, Dept				-0.07	0.06	-1.12									
HM, Team				0.58	0.22	2.65*	0.37	0.20	1.85	0.26	0.20	1.29	0.28	0.20	1.36
HM, Dept				0.25	0.28	0.88									
PA & WM HE				0.08	0.19	0.40									
HM							0.23	0.10	2.31*	0.24	0.10	2.32*	0.23	0.10	2.18*
Team WMC										0.52	0.25	2.10*	1.14	1.26	0.91
Dept WMC										0.16	0.34	0.48	-0.03	1.78	-0.02
HM * Team WMC													-0.12	0.24	-0.50
HM * Dept WMC													0.04	0.34	0.11

Note: * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, PA & WM HE = Physical Activity & Weight Maintenance Health Environment; N_{Emp} = 169, N_{Team} = 58, N_{Dept} = 33

Table 15

Model Fit Statistics for Predicting Employee Cardiovascular Physical Activity by Health Motivation and Weight Maintenance Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & WMC*	*Interaction*
Log Likelihood	-262.44	-253.21	-250.49	-247.52	-247.38
AIC	530.88	524.41	520.97	519.05	522.75
BIC	540.27	552.58	552.27	556.61	566.57
Δ Log Likelihood (*df*) to Null		9.23 (6) *	11.95 (7) *	14.92 (9) *	15.06 (11) *
Δ Log Likelihood (*df*) to Control^			2.72 (1) *	5.69 (3) *	5.83 (5) *
Δ Log Likelihood (*df*) to HM Only				2.97 (2) *ns*	3.11 (4) *ns*
Δ Log Likelihood (*df*) to HM & WMC					0.14 (2) *ns*
Level 2 Intercept Variance (*SD*)	0.19(0.44)	0.20(0.45)	0.13(0.37)	0.09(0.30)	0.08(0.29)

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables

Table 16

Estimates for Predicting Employee Light Physical Activity by Health Motivation and Weight Maintenance Culture

	Null model			*Control Only*			*HM Only*			*HM & WMC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.69	0.09	29.07*	10.65	3.79	2.81*	1.43	0.57	2.52*	1.42	0.56	2.53*	1.35	0.58	2.34*
Controls															
Block Order				-0.23	0.34	-0.68									
Language				0.12	0.22	0.57									
IA, Team				0.31	0.26	1.21									
IA, Dept				-0.94	0.71	-1.32									
Team Size				-0.01	0.01	-0.81									
Hrs, Team				0.02	0.06	0.43									
Hrs, Dept				-0.04	0.07	-0.62									
HM, Team				0.48	0.21	2.31*	0.27	0.19	1.43	0.18	0.20	0.90	0.15	0.20	0.76
HM, Dept				0.31	0.29	1.05									
PA & WM HE				-0.32	0.20	-1.66									
HM							0.25	0.11	2.21*	0.25	0.11	2.24*	0.26	0.11	2.31*
Team WMC										0.33	0.25	1.35	-0.32	1.32	-0.24
Dept WMC										0.33	0.35	0.94	1.58	1.88	0.84
HM * Team WMC													0.13	0.25	0.51
HM * Dept WMC													-0.24	0.36	-0.68

Note: * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, PA & WM HE = Physical Activity & Weight Maintenance Health Environment; N_{Emp} = 169, N_{Team} = 58, N_{Dept} = 33

Table 16

Model Fit Statistics for Predicting Employee Light Physical Activity by Health Motivation and Weight Maintenance Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & WMC*	*Interaction*
RSS	242.38	228.69	222.18	217.12	216.42
Log Likelihood	-270.00	-265.00	-263.00	-261.00	-261.00
AIC	545.00	537.00	534.00	534.00	537.00
BIC	551.00	546.00	546.00	553.00	562.00
Δ RSS (*df*) to Null		13.69 (1) *	20.20 (2) *	25.26 (4) *	25.96 (6) *
Δ RSS (*df*) to Control			6.51 (1) *	11.57 (3) *	12.27 (5) *ns*
Δ RSS (*df*) to HM Only				5.06 (2) *ns*	5.76 (4) *ns*
Δ RSS (*df*) to HM & WMC					0.70 (2) *ns*

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables

Table 17

Model Estimates for Predicting Fruit Consumption by Health Motivation and Weight Maintenance Culture

	Null model			*Control Only*			*HM Only*			*HM & WMC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.18	0.05	43.57*	3.15	0.83	3.76*	1.86	0.27	6.92*	1.83	0.27	6.72*	1.84	0.27	6.72*
Controls															
Block Order				0	0.19	0.03									
Language				-0.15	0.12	-1.25									
IA, Team				-0.03	0.15	-0.18									
IA, Dept				-0.38	0.40	-0.96									
Team Size				-0.01	0.01	-0.97									
Hrs, Team				0	0.03	-0.14									
Hrs, Dept				0.01	0.04	0.36									
HM, Team				-0.09	0.12	-0.76									
HM, Dept				0.13	0.16	0.79									
Nut & WM HE				-0.03	0.02	-1.51									
HM							0.06	0.05	1.24	0.07	0.05	1.31	0.07	0.05	1.29
Team WMC										-0.13	0.14	-0.95	0.56	0.73	0.76
Dept WMC										0.16	0.20	0.81	0.48	1.06	0.45
HM * Team WMC													-0.13	0.14	-0.95
HM * Dept WMC													-0.06	0.20	-0.29

Note: * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, Nut & WM HE = Nutrition & Weight Maintenance Environment; Because no significant control variables emerged, no models were compared to the control model beyond the null model; $N_{Emp} = 169$, $N_{Team} = 58$, $N_{Dept} = 33$

Table 17

Model Fit Statistics for Predicting Employee Fruit Consumption by Health Motivation and Weight Maintenance Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & WMC*	*Interaction*
RSS	71.31	66.96	70.66	70.16	69.54
Log Likelihood	-167	-162	-166	-166	-165
AIC	338	355	338	341	344
BIC	344	405	348	357	365
Δ RSS (*df*) to Null		4.35 (14) *ns*	0.65 (1) *ns*	1.15 (3) *ns*	1.77 (5) *ns*
Δ RSS (*df*) to HM Only				0.50 (2) *ns*	1.12 (4) *ns*
Δ RSS (*df*) to HM & WMC					0.62 (2) *ns*

Note: * $p < .05$; Because the control model had no significant variables and failed to out predict the null model, no other models were compared to it

Table 18

Multilevel Estimates for Model Predicting Employee Vegetable Consumption by Health Motivation and Weight Maintenance Culture

	Null model			*Control Only*			*HM Only*			*HM & WMC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.75	0.07	39.41*	3.09	1.13	2.75*	1.91	0.34	5.60*	1.92	0.35	5.55*	1.95	0.35	5.57*
Controls															
Block Order				-0.20	0.25	-0.80									
Language				-0.14	0.16	-0.87									
IA, Team				0.03	0.20	0.15									
IA, Dept				-0.14	0.54	-0.26									
Team Size				0	0.01	-0.33									
Hrs, Team				0.03	0.04	0.76									
Hrs, Dept				-0.02	0.05	-0.49									
HM, Team				0.22	0.16	1.35									
HM, Dept				0.14	0.22	0.63									
Nut & WM HE				0	0.02	-0.10									
HM							0.16	0.07	2.49*	0.16	0.07	2.43*	0.16	0.07	2.32*
Team WMC										-0.04	0.18	-0.22	0.53	0.93	0.57
Dept WMC										0.22	0.25	0.85	-0.67	1.34	-0.50
HM * Team WMC													-0.11	0.18	-0.63
HM * Dept WMC													0.17	0.25	0.67

Note: * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, Nut & WM HE = Nutrition & Weight Maintenance Environment; Because no significant control variables emerged, no models were compared to the control model beyond the null model; N_{Emp} = 169, N_{Team} = 58, N_{Dept} = 33

Table 18

Model Fit Statistics for Predicting Employee Vegetable Consumption by Health Motivation and Weight Maintenance Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & WMC*	*Interaction*
Log Likelihood	-209.66	-205.94	-206.56	-206.19	-205.87
AIC	425.32	445.89	421.13	424.37	427.73
BIC	434.71	499.10	433.65	443.15	452.77
Δ Log Likelihood (*df*) to Null		3.72 (14) *ns*	3.10 (1) *	3.47 (3) *ns*	3.79 (5) *ns*
Δ Log Likelihood (*df*) to HM Only				0.37 (2) *ns*	0.69 (4) *ns*
Δ Log Likelihood (*df*) to HM & WMC					0.32 (2) *ns*
Level 2 Intercept Variance (*SD*)	0.04 (0.21)	0.06 (0.24)	0.03 (0.19)	0.04 (0.20)	0.04 (0.19)

Note: * $p < .05$; Because the control model had no significant variables and failed to out predict the null model, no other models were compared to it

Table 19

Multilevel Estimates for Model Predicting Alcohol Consumption by Health Motivation and Responsible Drinking Culture

	Null model			*Control Only*			*HM Only*			*HM & RDC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	3.14	0.45	6.96*	9.22	5.82	1.59	8.46	2.51	3.37*	7.98	2.57	3.11*	8.19	2.64	3.10*
Controls															
Block Order				1.87	1.73	1.09									
Language				-2.30	1.07	-2.15*	-1.59	0.90	-1.76	-1.53	0.91	-1.69	-1.60	0.92	-1.74
IA, Team				-0.49	0.77	-0.63									
IA, Dept				-3.31	2.04	-1.62									
Team Size				-0.10	0.05	-2.08*	-0.09	0.05	-1.84	-0.10	0.05	-2.02*	-0.10	0.05	-1.99*
Hrs, Team				-0.29	0.29	-0.99									
Hrs, Dept				0.53	0.32	1.64									
HM, Team				0.03	1.02	0.03									
HM, Dept				-0.61	1.49	-0.41									
GOS HE				-0.08	0.26	-0.32									
HM							-0.67	0.48	-1.39	-0.55	0.49	-1.12	-0.60	0.51	-1.18
Team RDC										-1.29	0.94	-1.37	-3.07	5.35	-0.57
Dept RDC										0.04	1.13	0.04	-1.49	6.78	-0.22
HM * Team RDC													0.35	1.04	0.34
HM * Dept RDC													0.31	1.33	0.23

Note: * $p < .05$; RDC = Responsible Drinking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, GOS HE = General Organizational Support Health Environment; $N_{Emp} = 161$, $N_{Team} = 58$, $N_{Dept} = 34$

Table 19

Model Fit Statistics for Predicting Alcohol Consumption by Health Motivation and Responsible Drinking Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & RDC*	*Interaction*
RSS	5237.00	5006.70	4945.90	4867.70	4853.80
Log Likelihood	-509.00	-493.00	-504.00	-503.00	-503.00
AIC	1022.00	1017.00	1018.00	1020.00	1023.00
BIC	1028.00	1063.00	1034.00	1041.00	1051.00
Δ RSS (*df*) to Null		230.30 (2) *	291.10 (3) *	369.30 (5) *	383.20 (7) *ns*
Δ RSS (*df*) to Control^			60.80 (1) *ns*	139.00 (3) *ns*	152.90 (5) *ns*
Δ RSS (*df*) to HM Only				78.20 (2) *ns*	92.10 (4) *ns*
Δ RSS (*df*) to HM & RDC					13.90 (2) *ns*

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables

Table 20

Multilevel Estimates for Model Predicting Employee Smoking by Health Motivation and Antismoking Culture

	Null model			*Control Only*			*HM Only*			*HM & ASC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	1.27	0.47	2.68*	7.07	2.49	2.84*	6.19	2.47	2.51*	6.40	2.51	2.55*	6.18	2.57	2.41*
Controls															
Block Order				-3.47	1.66	-2.10*									
Language				-0.16	1.07	-.15									
IA, Team				0.64	0.35	1.84									
IA, Dept				-0.36	1.79	-0.20									
Team Size				-0.05	0.05	-0.89									
Hrs, Team				-0.16	0.30	-0.52									
Hrs, Dept				-0.40	0.32	-1.25									
HM, Team				0.25	0.99	0.25									
HM, Dept				1.01	1.54	0.66									
HM							-0.97	0.48	-2.03*	-1.02	0.49	-2.10*	-0.96	0.50	-1.91
Team ASC										-0.78	1.13	-0.69	-11.69	6.24	-1.87
Dept ASC										1.09	1.20	0.91	13.04	7.05	1.85
HM * Team ASC													2.19	1.23	1.79
HM * Dept ASC													-2.40	1.40	-1.72

Note: * $p < .05$; ASC = Antismoking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, $N_{Emp} = 149$, $N_{Team} = 59$, $N_{Dept} = 34$

Table 20

Model Fit Statistics for Predicting Employee Smoking by Health Motivation and Antismoking Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM &* ASC	*Interaction*
Log Likelihood	-466.93	-464.29	-464.90	-464.45	-462.61
AIC	939.85	944.58	937.80	940.89	427.73
BIC	948.87	968.62	949.81	958.91	452.77
Δ Log Likelihood (*df*) to Null		2.64 (5) *ns*	2.03 (1) *	2.48 (3) *ns*	4.32 (5) *ns*
Δ Log Likelihood (*df*) to Control^			0.61 (4) *ns*	0.16 (2) *ns*	1.68 (0) *
Δ Log Likelihood (*df*) to HM Only				0.45 (2) *ns*	2.29 (4) *ns*
Δ Log Likelihood (*df*) to HM & ASC					1.84 (2) *ns*
Level 2 Intercept Variance (*SD*)	1.10 (1.05)	1.41 (1.19)	1.54 (1.24)	1.63 (1.28)	0.04 (0.19)

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables

For light physical activity, the most parsimonious model only included employee health motivation and the control variable for aggregated team health motivation. This model outperformed the null model, χ^2 (2) = 13.67, p = .001, and the control model, χ^2 (1) = 8.71, p = .003. Furthermore, though team weight maintenance culture, b = .33, t(164) = 1.35, p = .18, and department weight maintenance culture, b = .33, t(164) = 0.94, p = .35, failed to predict light physical activity, health motivation significantly related to light physical activity in every model, b = .25, t(164) = 2.24, p = .03. In addition, no interactions between health motivation and weight maintenance culture were significant; thus, Hypothesis 4 for light physical activity was not supported.

For fruit consumption, no model outperformed the null model, and no variable emerged as a significant predictor. Hypothesis 4 for fruit consumption was not supported.

For vegetable consumption, the most parsimonious model included only employees' health motivation. It outperformed the null model, and no control variables significantly related to vegetable consumption to compare it to. In every model, health motivation positively predicted employee vegetable consumption, γ = .16, t(164.70) = 2.49, p = .01. Team weight maintenance culture, γ = -0.04, t(63.72) = -0.22, p = .83, and department weight maintenance culture did not predict vegetable consumption, γ = .22, t(125.02) = 0.85, p = .40, nor did they interact with employees' health motivation. As such, Hypothesis 4 for vegetable consumption was not supported.

Table 21

Estimates+ for Model Predicting Employee Cardiovascular Exercise by Health Motivation and Weight Maintenance Culture with Multiple Imputation

	Null model			*Control Only*			*HM Only*			*HM & WMC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	2.65	0.07	38.11*	2.66	3.56	0.75	1.38	0.52	2.66*	1.40	0.52	2.71*	1.45	0.53	2.76*
Controls															
Block Order				-0.63	0.32	-2.01									
Language				0.12	0.19	0.64									
IA, Team				0.06	0.23	0.25									
IA, Dept				-0.22	0.63	-0.34									
Team Size				0	0.01	0.40									
Hrs, Team				0	0.05	0.05									
Hrs, Dept				-0.03	0.06	-0.52									
HM, Team				0.59	0.19	3.11*	0.22	0.18	1.23	0.14	0.18	0.79	0.16	0.18	0.89
HM, Dept				-0.05	0.27	-0.19									
PA & WM HE				0.04	0.18	0.20									
HM							0.25	0.10	2.45*	0.25	0.10	2.44*	0.24	0.10	2.31*
Team WMC										0.40	0.22	1.83	1.11	1.15	0.96
Dept WMC										0.37	0.32	1.17	0.24	1.75	0.14
HM * Team WMC													-0.14	0.22	-0.63
HM * Dept WMC													0.03	0.33	0.08

Note: * $p < .05$; WMC = Weight Maintenance Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, PA & WM HE = Physical Activity & Weight Maintenance Health Environment; N_{Emp} = 282, N_{Team} = 63, N_{Dept} = 39; + Model became singular when department weight maintenance culture was added, so analyses were run as linear regression.

Table 21

Model Fit Statistics for Predicting Employee Cardiovascular Exercise by Health Motivation and Weight Maintenance Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & WMC*	*Interaction*
Δ Log Likelihood (*df*) to Null+	-	*	*	*	*ns*
Δ Log Likelihood (*df*) to Control^+			*	*	*ns*
Δ Log Likelihood (*df*) to HM Only+				*ns*	*ns*
Δ Log Likelihood (*df*) to HM & WMC+					*ns*

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables; + models were compared using log likelihood testing; however, because the datasets were generated using multiple imputation, R was only provided the significance between the models without providing the exact log likelihood for each value. Some models could not be compared because they were not contained within previous models.

For alcohol consumption, the best fitting model using the raw dataset contained only the control variables of survey language and team size. Health motivation, b = -0.55, $t(155)$ = -1.12, p = .27, team responsible drinking culture, b = -1.29, $t(155)$ = -1.37, p = .17, department responsible drinking culture, b = .04, $t(155)$ = 0.04, p = .97, and the interaction between these cultures and employees' health motivation failed to predict alcohol consumption.[8] Nevertheless, because no interaction terms were significant, Hypothesis 4 regarding alcohol consumption was not supported.

For smoking, the best fitting model contained only employee health motivation, which significantly predicted tobacco consumption, γ = -.97, $t(145.85)$ = -2.03, p = .04. Though health motivation maintained significantly related to tobacco consumption when team and department antismoking cultures were added, γ = -1.02, $t(143.41)$ = -2.10, p = .04, it lost significance when the interaction terms were added to the model. When modeled using the imputed datasets, health motivation significantly predicts smoking frequency when modeled by itself, γ = -1.24, $t(34.64)$ = -2.84, p = .007, but loses its significance when team and department antismoking cultures are added to the models, γ = -.72, $t(76.07)$ = -1.62, p = .11. In both the raw and imputed datasets (see Table 23 for all model estimates and comparisons for smoking using the imputed datasets), health

[8] However, when using the imputed datasets, survey language and team size lost their significance, and employee health motivation significantly predicted employee alcohol consumption when modeled alone, b = -.97, $t(213.77)$ = -2.59, p = .01. When team and department responsible drinking culture were added to the model, employee health motivation no longer predicted employee alcohol consumption. All model estimates and model comparisons using the imputed datasets for alcohol consumption can be found in Table 22. These exploratory analyses provide tentative support that employees' health motivation may exert weak but significant effects on their alcohol consumption.

motivation fails to interact with antismoking culture, so Hypothesis 4 for smoking behavior is not supported.

Taken together, these results show that, though employees' health motivation relates to a variety of health behaviors, including physical activity, vegetable consumption, alcohol consumption, and smoking, their health motivation does not interact with their team or department's health culture. The data fail to support Hypothesis 4 across all measured health behaviors in this dissertation.

Hypothesis 5 stated that employees' health motivation would moderate the effects of their team and department's health culture on their job satisfaction. Table 24 displays the results for the model estimates and model comparisons regarding job satisfaction.

Table 22

Multilevel Estimates for Model Predicting Alcohol Consumption by Health Motivation and Responsible Drinking Culture

	Null model			*Control Only*			*HM Only*			*HM & RDC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	3.30	0.35	9.32*	8.45	5.72	1.48	8.17	1.93	4.23*	5.73	2.41	2.38*	5.84	2.45	2.38*
Controls															
Block Order				1.95	1.64	1.19									
Language				-1.31	0.97	-1.36									
IA, Team				-0.16	0.72	-0.22									
IA, Dept				-2.13	1.88	-1.13									
Team Size				-0.08	0.05	-1.59									
Hrs, Team				-0.55	0.25	-2.21*									
Hrs, Dept				0.72	0.29	2.53*									
HM, Team				-0.17	0.96	-0.18									
HM, Dept				-1.05	1.36	-0.77									
GOS HE				-0.15	0.26	-0.59									
HM							-0.97	0.38	-2.59*	-0.49	0.47	-1.05	-0.52	0.48	-1.08
Team RDC										-1.42	0.88	-1.61	-1.45	5.18	-0.28
Dept RDC										-0.20	1.09	-0.18	-1.78	6.54	-0.27
HM * Team RDC													0	1.00	0
HM * Dept RDC													0.32	1.28	0.25

Note: * $p < .05$; RDC = Responsible Drinking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation, GOS HE = General Organizational Support Health Environment; N_{Emp} = 282, N_{Team} = 63, N_{Dept} = 39

Table 22

Model Fit Statistics for Predicting Alcohol Consumption by Health Motivation and Responsible Drinking Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & RDC*	*Interaction*
Δ Log Likelihood (*df*) to Null+	-	*ns*	*	*ns*	*ns*
Δ Log Likelihood (*df*) to Control^+			-	-	*ns*
Δ Log Likelihood (*df*) to HM Only+				*ns*	*ns*
Δ Log Likelihood (*df*) to HM & RDC+					*ns*

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables; + models were compared using log likelihood testing; however, because the datasets were generated using multiple imputation, R was only provided the significance between the models without providing the exact log likelihood for each value. Some models could not be compared because they were not contained within previous models.

Table 23

Multilevel Estimates for Model Predicting Smoking Behavior by Health Motivation and Antismoking Culture

	Null model			*Control Only*			*HM Only*			*HM & ASC*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	1.55	0.48	3.26*	6.43	2.16	2.98*	7.79	2.37	3.28*	4.84	2.26	2.14*	4.83	2.30	2.11*
Controls															
Block Order				-1.66	1.40	-1.18									
Language				-0.24	0.89	-0.27									
IA, Team				0.54	0.32	1.68									
IA, Dept				-0.65	1.45	-0.44									
Team Size				-0.05	0.05	-0.98									
Hrs, Team				-0.06	0.22	-0.25									
Hrs, Dept				-0.41	0.26	-1.61									
HM, Team				-0.17	0.96	-0.18									
HM, Dept				0.83	0.92	0.90									
HM							-1.24	0.44	-2.84*	-0.72	0.44	-1.62	-0.69	0.45	-1.55
Team ASC										-0.67	1.00	-0.67	-9.75	5.71	-1.71
Dept ASC										0.89	1.07	-0.84	10.63	6.55	1.62
HM * Team ASC													1.82	1.13	1.62
HM * Dept ASC													-1.97	1.33	-1.48

Note: * $p < .05$; ASC = Antismoking Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation; $N_{Emp} = 282$, $N_{Team} = 63$, $N_{Dept} = 39$

Table 23

Model Fit Statistics for Predicting Smoking Behavior by Health Motivation and Antismoking Culture (Continued)

	Null model	*Control Only*	*HM Only*	*HM & ASC*	*Interaction*
Δ Log Likelihood (*df*) to Null+	-	*ns*	*	*ns*	*ns*
Δ Log Likelihood (*df*) to Control^+			-	-	*ns*
Δ Log Likelihood (*df*) to HM Only+				*ns*	*ns*
Δ Log Likelihood (*df*) to HM & RDC+					*ns*

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables; + models were compared using log likelihood testing; however, because the datasets were generated using multiple imputation, R was only provided the significance between the models without providing the exact log likelihood for each value. Some models could not be compared because they were not contained within previous models.

Table 24

Multilevel Estimates for Model Predicting Employee Job Satisfaction

	Null model			*Control Only*			*HM Only*			*Main Effects*			*Interaction*		
	Est	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t	*Est*	SE	t
Intercept	4.19	0.07	57.72*	3.36	1.06	3.18*	2.59	0.32	8.10*	2.69	0.32	8.37*	2.72	0.49	8.30*
Controls															
Block Order				0.19	0.20	0.93									
Language				-0.13	0.13	-1.05									
IA, Team				-0.31	0.23	-1.38									
IA, Dept				0.65	0.50	1.31									
Team Size				-0.01	0.01	-1.73									
Hrs, Team				0.02	0.03	0.65									
Hrs, Dept				-0.02	0.04	-0.44									
HM, Team				0.21	0.13	1.60									
HM, Dept				-0.19	0.19	-1.00									
Nut HE**				0.09	0.04	2.23*	0.09	0.04	2.53*	0.07	0.04	1.97	0.07	0.04	1.91
HM							0.23	0.05	4.40*	0.22	0.05	4.22*	0.21	0.05	4.05*
Team HC										0.48	0.17	2.89*	0.37	0.94	0.40
Dept HC										0.31	0.30	1.06	-0.19	1.28	-0.15
HM * Team HC													0.02	0.18	0.11
HM * Dept HC													0.10	0.25	0.40

Note: * $p < .05$; HC = Health Culture, Hrs = Hours spent face-to-face with team/department members, IA = Interrater Agreement, HM = Health Motivation; Nut HE = Nutrition Health Environment; Because no significant control variables emerged, no models; $N_{Emp} = 167$, $N_{Team} = 57$, $N_{Dept} = 33$; **All health environment scores were put into the model, but due to rank deficiency and lack of variability across worksites, all others were dropped.

Table 24

Model Fit Statistics for Predicting Employee Job Satisfaction (Continued)

	Null model	*Control Only*	*HM Only*	*HM & HC*	*Interaction*
Log Likelihood	-174.57	-171.30	-162.70	-157.09	-156.88
AIC	357.14	352.60	337.40	330.19	333.76
BIC	369.6`	368.19	356.11	355.13	364.94
Δ Log Likelihood (*df*) to Null		3.27 (1) *	11.87 (2) *	17.48 (4) *	17.69 (6) *
Δ Log Likelihood (*df*) to Control^			8.60 (1) *ns*	14.21 (3) *	14.42 (5) *
Δ Log Likelihood (*df*) to HM Only				5.61 (2) *	5.82 (4) *
Δ Log Likelihood (*df*) to HM & HC					0.21 (2) *ns*
Level 2 Intercept Variance (*SD*)	0.08(0.28)	0.05(0.23)	0.05(0.22)	0.01(0.12)	0.01(0.10)
Level 3 Intercept Variance (*SD*)	0.03(0.17)	0.02(0.15)	0.07(0.27)	0.12(0.35)	0.12(0.35)

Note: * $p < .05$; ^ Control model comparisons are shown only for significant variables

Unexpectedly, the number of worksite nutrition policies[9] had a small but significantly positive effect on employee job satisfaction, $\gamma = .08$, $t(93.06) = 2.23$, $p = .03$, and this variable by itself outperformed the intercept-only model, $\chi^2 (1) = 6.54$, $p = .01$, and was retained for all subsequent models. The best fitting model included health motivation and team and department health culture, which outperformed the null model, $\chi^2 (4) = 34.95$, $p < .001$, control-only model, $\chi^2 (3) = 28.41$, $p < .001$, and the health motivation-only model, $\chi^2 (2) = 11.21$, $p = .004$. Both employee health motivation, $\gamma = .22$, $t(150.68) = 4.22$, $p < .001$, and team health culture, $\gamma = .48$, $t(55.03) = 2.89$, $p = .005$, positively related to employee job satisfaction. However, when the interaction terms were added to the model, only employee health motivation significantly predicted job satisfaction, $\gamma = .21$, $t(148.08) = 4.05$, $p < .001$. Because no interaction was found between employee health motivation and health culture, Hypothesis 5 was not supported.

3.1 Exploratory Post-Hoc Analyses

After performing the planned analyses, two sets of post-hoc analyses were performed to explain some of the previous results. First, I wanted to explain why health motivation on its own predicted job satisfaction. Because health behaviors, notably exercise, have been associated with increases in positive affect (Sin, Moskowitz, & Whooley, 2015), I built a mediated path model in lavaan (Rosseel, 2012) that had employees' health motivation influencing their job satisfaction through their vigorous and light physical activity. Unfortunately, this model failed to reach sufficient fit, $\chi^2 = 237.23$, $df = 63$; RMSEA = .10, SRMR = .10; CFI = .83. Next, I maintained health

[9] Originally, all aspects of the health environment were controlled for, but doing so made the model rank deficient. As a result, only the nutrition-based aspects were retained.

motivation's indirect effects on job satisfaction through physical activity, but I also allowed it to have a direct relationship as well. This model also failed to achieve satisfactory fit indices, $\chi_2 = 225.07$, $df = 62$; RMSEA = .10, SRMR = .08; CFI = .84. Last, in addition to these analyses with physical activity, I tried a range of other models with all other health behaviors, but no model fit well.

Second, I wanted to replicate past findings that average tenure shares a curvilinear relationship with group agreement (Beus, Bergman, & Payne, 2010), as rwg(j) scores for antismoking and responsible drinking cultures in the data showed wide variability. For every team and department that had at least two respondents ($N_{Team} = 63$, $N_{Dept} = 39$), I first ran a simple linear regression with average team (or department) tenure predicting interrater agreement for health culture and its facets. Next, I ran a polynomial regression with the same variables and compared the two models. At the department level, none of simple linear regression nor polynomial regression models significantly predicted agreement about the department health culture or any of its facets. At the team level, no model significantly predicted team agreement about the antismoking or weight maintenance cultures. In contrast, average team tenure did share a significant, linear relationship with interrater agreement about responsible drinking culture, $b = -0.48$, $t(58) = -2.49$, $p = .02$, but the polynomial model failed to outperform the linear model, $F(1, 57) = 2.06$, $p = .16$. However, when all facets of health culture were aggregated, the polynomial model predicted agreement about the team health culture better than the linear model, $F(1, 56) = 4.29$, $p = .04$. To explore why this discrepancy emerged between aggregated health culture and responsible drinking culture, the data were visually inspected using a scatter plot. No singular outlier was detected for the analyses predicting

agreement of responsible drinking culture; however, for aggregated health culture, one team with an average tenure of more than nine years had much lower agreement than all other teams. Analyses were conducted again with this outlier removed, and average team tenure no longer predicted interrater agreement of health culture. Thus, these exploratory analyses fail to replicate past findings from Beus and colleagues (2010).

CHAPTER 4: DISCUSSION

I had three aims with this dissertation. To start, as the first study to examine two levels of health culture simultaneously, I sought to show the distinction of health culture at various levels in an organization. Though they were far from completely overlapping, the data showed strong, positive correlations between the health cultures at the team and department levels. Next, because the current study was the second study of health culture in an eastern society (Jia et al., 2017) and the first to study health culture with a primarily Vietnamese sample, I wanted to replicate past findings that health culture relates to diet and physical activity and also to provide support for the relationship of health culture to alcohol consumption and smoking behaviors. Results consistently showed that team health culture exerted stronger or equally as strong effects across health behaviors as department health culture. Furthermore, team weight maintenance culture predicted exercise behavior above and beyond department health culture. Third, I sought to show that employees' health motivation moderates the effects of their team and department's health culture on their health behaviors and job satisfaction. Though the current results failed to show any interaction between employees' health motivation and their units' health cultures, health motivation related broadly to all health behaviors except fruit and alcohol consumption. Moreover, employees' health motivation and their team's health culture positively related to their job satisfaction.

In regard to the high overlap between team and department health culture, their strong, positive correlations make sense in hindsight. Many departments and teams shared a similar composition of members. For instance, in addition to most teams and departments consisting of only Vietnamese individuals, post-hoc analyses revealed that

the majority of teams and a third of departments consisted solely of either men or women. Similarly, participants of most teams and departments were within approximately three or five years, respectively, of each other. This homogeneity in groups, coupled with the fact that teams and departments had overlapping members, likely resulted in individuals basing their perceptions of their team and department culture off of similar environmental cues.

In regard to specific health behaviors, neither team nor department antismoking culture predicted smoking behavior, but this null finding might be due to less than five percent of participants identifying as smokers. This restriction of range in the sample's smoking behavior makes it impossible to draw definitive conclusions about antismoking culture's relationship—or lack thereof—to smoking behaviors. Although these null findings are consistent with previous results on the topic (Basen-Engquist et al., 1998; Ribisl & Reischl, 1993), methodological issues may explain all of the null findings to date. Specifically, though past studies (Basen-Engquist et al., 1998; Ribisl & Reischl, 1993) had adequate numbers of smokers in their samples, these researchers unfortunately reduced their power by asking participants about their smoking *status* (Yes – No) instead of their smoking *frequency*. In contrast, the current study asked about smoking frequency but had too few smokers. To combat the rise of e-cigarette use (Jarmul et al., 2017; Perikleous, Steiropoulos, Paraskakis, Constantinidis, & Nena, 2018), future research using frequency measures with adequate-sized and diverse samples is recommended before concluding that antismoking culture at work has no impact on smoking behaviors.

Further, neither team nor department weight maintenance culture predicted fruit or vegetable consumption. In contrast to culture findings on smoking, however, these null

results are particularly surprising, as health cultures' relationship to positive diet choices have been well-established (Sonnentag & Pundt, 2016; Sonnentag et al., 2017; Sliter, 2013). Several reasons might account for these inconsistent results. First, unlike these past studies conducted in developed, western countries (i.e., Germany and the United States), the sample in the current study lives in a developing country, which is currently undergoing a massive nutrition transition (Reardon & Timmer, 2014). For instance, traditional markets are being replaced by supermarkets and convenience stores (Rupa, Umberger, & Zeng, 2019). Though the Vietnamese Ministry of Health has prioritized improving the diets of Vietnamese citizens (Khan & Hoan, 2008), many developing countries experience mixed results in diet quality as their citizens begin obtaining more food from supermarkets (Hawkes, 2008). These largescale transitions may explain why, in the current study, team and department health culture failed to predict fruit and vegetable consumption, unlike past studies: with so many large, sociological factors determining their food choices, participants may not be influenced by their coworkers. Clearly, more research is needed on how, and if, organizational cultures influence diet during massive changes to the larger food environment.

I also found no support for the hypothesis that team or department responsible drinking culture would predict employee frequency of alcohol consumption. These null findings may be due to reductions in power, as about half of participants failed to indicate how often they drank alcohol. This lower response rate may have been due to social desirability pressures, as though participants were reassured that management would not see their results, management still deployed the survey. Furthermore, because the management of Company Y was involved with this study, there was concern that

participants would not respond candidly about their binge drinking rates, so the current study only examined frequency of *any* alcohol consumption. However, frequent binge drinking poses more serious health consequences than equally frequent episodes of moderate drinking (Molina & Nelson, 2018), so this dimension represents an important gap in our understanding. Future studies should still explore responsible drinking culture's potential relationships with alcohol consumption and binge drinking with more participants and in a way that provides participants with more reassurance that their data are anonymous before concluding that no relationship exists.

With respect to weight maintenance, I did obtain support for the expectation that team weight maintenance culture positively related to vigorous and light physical activity, though department weight maintenance culture did not. When modeled together, team weight maintenance culture became nonsignificant in predicting light physical activity, but it still significantly predicted vigorous physical activity above and beyond department weight maintenance culture.

In summary, this study provides only weak support (i.e., team weight maintenance culture on vigorous physical activity) for the impact of health culture on employee health behaviors. In light of the null findings for every other health behavior when both team and department health culture were modeled together, the current study cannot rule out the possibility that the results regarding vigorous physical activity may be due to chance.

Nevertheless, other interpretations may exist for the significant findings of vigorous physical activity despite other null findings in the current study. First, past research has shown that an organization's health climate does significantly relate to

employees' exercise behaviors (Sliter, 2013) and exercise attitudes (Ribisl & Reischl, 1993), so this finding is supported by previous findings. One reason why team weight maintenance culture maintains its significance for vigorous but not light physical activity may be due to coworkers increasing the salience of vigorous physical activities through bragging. For instance, employees, especially men, boast about their exercise behavior, such as how frequently they go to the gym or the sports in which they participate (Decapua & Boxer, 1999). By boasting about specific behaviors, the weight maintenance culture may make other employees focus only on those targeted behaviors rather than increasing all behaviors related to weight maintenance. This interpretation aligns with the theory of normative conduct, which states that many norms operate by focusing an individual's motivation toward specific behaviors (Cialdini, Kallgren, & Reno, 1991). For other health behaviors, such as specifics about their diet or light physical activity, employees may be less inclined to boast. Additionally, it may be inappropriate to brag about certain behaviors in a work context, such as drinking or smoking.

Furthermore, team culture is more proximal to employees' behavior than department culture, so if only one level significantly relates to a health behavior, it would be the former, as proximal influences tend to exert stronger effects on behavior than distal ones (Kanfer 1990, 1992). In this case, employees in this organization typically work more closely with team members than department members, and as a result, they have more opportunity to be influenced by their team than their department. Though this interpretation of the results aligns with extant theory, future research is needed to replicate these findings that only team weight maintenance culture predicts vigorous physical activity above and beyond the department culture. In addition, future research

should measure if and how often employees boast about their health behavior and test if this potential bravado moderates the effects of the health culture.

The final goal of this thesis was to show the interaction between employees' health motivation and their team and department health culture. Unfortunately, no significant interaction emerged between employee health motivation and either level of health culture when predicting physical activity, diet, alcohol consumption, smoking, or job satisfaction. Despite the lack of an interaction between employee health motivation and health culture, employee health motivation significantly predicted job satisfaction, physical activity, vegetable consumption, and smoking but not alcohol or fruit consumption. Unlike past research (Moorman & Matulich, 1993), employee health motivation failed to predict fruit consumption in all models. These null results may be due to misinformation in consumers about the insalubriousness of fruits. For instance, at least in the United States, health-conscious consumers have become more concerned about sugar in their diet (International Food Information Council, 2018; Van Buul, Tappy, & Brouns, 2014). Because fruits contain fructose, a natural sugar, some of these consumers have reported intentionally reducing their fruit intake in order to curtail their sugar intake (International Food Information Council, 2018). This reduction in fruit consumption is unfortunate because fructose in fruit seems to have beneficial effects for humans, unlike when fructose is added to soft drinks (Choo et al., 2018).

Furthermore, though health motivated individuals tend to have higher health knowledge than their less motivated counterparts (Moorman & Matulich, 1993), Sonnentag and colleagues (2017) demonstrated that, if health motivated individuals *believe* that a food is healthy or unhealthy, then they will adjust their behavior

accordingly, even if their beliefs are erroneous. Thus, the null effects regarding health motivation and fruit consumption may be due to some health motivated individuals elevating their fruit consumption whereas others are actively suppressing theirs. Future studies should examine if Vietnamese individuals perceive fruit to be unhealthy, as this misperception may help to explain some of the country's below-average fruit consumption (Bui et al., 2016).

Fruit consumption aside, the pattern of findings regarding health motivation replicate past research (Moorman & Matulich, 1993), although the mixed results linking health motivation to alcohol consumption and smoking behavior represent novel contributions. The latter, however, should be interpreted with extreme caution due to the few numbers of smokers in this present study. Nonetheless, past research has shown that smoking patterns can be highly variable both between and within smokers, so health motivation could predict smoking patterns, especially among individuals trying to quit (Hughes et al., 2017). Taken together, these results suggest that employee health behaviors are driven more so by their own motivation rather than the health culture created by their team or department.

This finding may be because the average team and department health culture were near the midpoint; thus, despite employees agreeing on the culture, the health cultures were not polarizing in one direction or another. When situations are loosely defined, individual differences play a larger role than external forces (Mischel, 1976). Thus, before accepting that employee health motivation always outweighs their team and department's health culture, future research should examine if clearly defined health cultures at either extreme (very healthy or unhealthy) dwarf the effects of employee's

health motivation when compared to middle-of-the-road ones. Furthermore, this study looked at trait health motivation, but past research has found that health climates can be mediated through employees' state health motivation to influence their diet behaviors (Sonnentag et al., 2017). Over time, prolonged changes to employees' state health motivation may gradually influence their trait health motivation. Alternatively, rather than driving employees' health motivation, beneficial health cultures may simply support employees' pre-existing health motivation. Future research should explore how and if this process unfolds.

Though employee health motivation overshadowed the effects of health culture on associated health behaviors, employee health motivation and team health culture both significantly predicted employee job satisfaction above and beyond each other. Furthermore, though department health culture failed to predict job satisfaction when accounting for team health culture, post hoc analyses reveal that it shares a positive relationship with job satisfaction when modeled by itself. This positive relationship between health culture and job satisfaction mirrors similar research linking health culture to employee happiness, affective commitment, and reduced burnout (Ernsting et al., 2013; Jia et al., 2017; Zweber et al., 2016). On the other hand, the relationship between health motivation and job satisfaction is a novel finding. My initial post-hoc explanation for this main effect was that, because health-motivated individuals engage in more health behaviors, they may experience higher positive affect. In turn, this elevated positive affect makes them perceive greater job satisfaction. However, all exploratory path models with health motivation's effects on job satisfaction being mediated through increased health behaviors to job satisfaction failed to fit well. Another explanation is that the

relationship is purely correlational. Past meta-analyses have shown positive correlations between a variety of types of motivation and life satisfaction (Tang, Wang, & Guerrien, 2019), so it may be that more health motivated individuals also happen to be more satisfied across a wide variety of domains. Future research is needed to disentangle health motivation's relationship with job satisfaction.

For instance, researchers could survey new employees about their health motivation and job satisfaction within a few months of starting a new job. After a year of working at their job, researchers should resurvey them about their health motivation and job satisfaction. Next, by using a cross-lagged panel correlation design (Kenny & Harackiewicz, 1979), researchers could test various models, including if it is plausible that health motivation causes job satisfaction or vice versa.

Despite these positive main effects of health motivation and team health culture on job satisfaction, however, health motivation and health culture failed to interact, failing to support my hypothesis. One explanation for the lack of an interaction between employee health motivation and health culture may be because health motivation reflects an individual's propensity and drive to behaving healthy *in general* (Moorman & Matulich, 1993). On the other hand, health *goals* tend to be more domain specific, whether they are to lose weight or stop smoking, for instance (Carney & Patrick, 2017). Thus, it may not be important if a health culture conflicts with employees' health motivation, but employees may experience negative outcomes, such as frustration, if the health culture thwarts their more targeted health goals. For instance, if an employee wants to reduce his sugar intake, he may feel frustrated that his supervisor brings in tempting sweets to meetings.

In addition to investigating the major hypotheses, I also conducted post-hoc exploratory analyses to explore whether tenure predicted group agreement about their team or departments' health culture, as it does with safety climate (Beus et al., 2010). Doing so is crucial, as we know little about how health cultures form or how groups come to agree about their unit's health culture. Unfortunately, these analyses failed to support past research by Beus and colleagues' (2010) that found that group tenure shares a curvilinear relationship with agreement about a culture or climate. Average department tenure shared no relationship with group interrater agreement; however, these null results may be due to the relatively small sample of departments (N_{Dept} = 39). At the team level, average team tenure initially shared a curvilinear relationship with agreement for team health culture globally, but this relationship disappeared after removing an outlier with low agreement but high tenure. Interestingly, at the facet level, average team tenure failed to relate to agreement about the weight maintenance or antismoking cultures, but it shared a negative, linear relationship with agreement for the responsible drinking culture.

A few possible explanations may account for these findings. From a statistical perspective, the average team tenure was about one year, but of the 63 teams, four teams had a tenure of nine or more years. These few cases greatly expanded the range of tenure and may have unduly influenced the relationship between average team tenure and agreement about the team's responsible drinking culture. On the other hand, recent research shows that of all age groups in Vietnam, middle-aged individuals drink the most frequently (Chaiyasong et al., 2018). As age and team tenure were correlated (r = .45), it could be that high variability in drinking frequency among older individuals makes it

more difficult for team members to gauge the responsible drinking culture on the team. Future research should try to replicate this finding to see if it is spurious or a true finding.

4.1 Theoretical Implications

The current study has three main implications for health culture theory. First, this study provided tentative support that, at least for vigorous physical activity and employee job satisfaction, the effects of health culture at different organizational levels may not always be equivalent. This finding mirrors past research on organizational culture (Bezrukova et al., 2012) and safety climate (Zohar & Luria, 2005). Like in these domains, researchers must be intentional about the level of analysis for health culture, as this study shows that the referent can meaningfully change results. For instance, only team weight maintenance culture related to physical activity. Future research should try to explain when more distal cultural forces will influence health behaviors and when they will not. As an example, self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987; Turner & Reynolds, 2012) states that, when individuals identify strongly with a group, their self-identification increases their conformity to the group's norms. Thus, an employee that identifies more strongly with their department rather than their team may be more inclined to conform to the more distal culture instead of their team's culture.

Second, the current study failed to replicate one of the most robust findings in the health culture and health climate literature; namely, its positive relationship with fruit consumption. Moreover, even health motivation failed to predict participants' fruit consumption. This null finding is surprising because variability for fruit consumption existed within the current sample, and this fruit consumption falls in line with past

research on fruit consumption in Vietnam that used a nationally representative sample (Bui et al., 2016). As previously mentioned, Vietnam, like most of Southeast Asia, is undergoing a massive transformation in the food landscape (Reardon & Timmer, 2014; Rupa et al., 2019), so it may be that, with so many changes, employees' health motivation and the health culture at their work cease to be important predictors in their food consumption. Future research should elucidate how organizations can help employees maintain a healthy diet despite these widespread changes in food availability. For example, a midwestern university began a program to host local farmers' markets on campus during work hours. In addition, they offered healthy cooking demonstrations and free nutrition counseling to coincide with the market's offerings (Jenkins, Fakhoury, Marzec, & Harlow-Rosentraub, 2015). Programs that make healthy foods available—and educate others on what constitutes healthy and unhealthy food choices—may be instrumental, especially during this transition when an influx of highly-processed foods are being marketed as "healthy."

Last, the current study failed to find any interaction between employees' health motivation and the health culture on their team or department. If this null finding is true, then employees with low health motivation may not experience any deleterious effects from being in work units with robust health cultures. However, before researchers and organizations accept that robust health cultures bear no risk to employees, research on other potential moderators are needed. For instance, future research should explore if body-mass index (BMI) moderates the positive relationship between team health culture and job satisfaction. With anti-fat attitudes rampant in many organizations (Roehling, 1999), teams with high health cultures may judge or bully heavier individuals. This

weight stigma could result in discriminatory recruitment practices (Flint et al., 2016) or cause overweight employees to avoid healthy behaviors, like exercising (Vartanian & Shaprow, 2008). Thus, though the current study did *not* demonstrate any negative effects of having a robust health culture, future scientists should continue this line of research into the potential dark side of having a robust health culture.

4.2 Practical Implications

This study highlights how health culture at different levels of an organization may vary in their effectiveness in shaping employees' health behaviors. Furthermore, it appears that, when health culture does affect health behaviors, such as with light and vigorous physical activity, only health culture at the team level increases these behaviors. Based on these results, organizations looking to increase the physical activity of their employees should start with initiatives to increase team health culture rather than at more distal levels of the organization, such as the department.

In addition to boosting employees' physical activity levels, the findings obtained show that health culture relates to employees' job satisfaction. Though the current study cannot make causal claims about the relationship between health culture and job satisfaction, longitudinal research has shown a causal link from an organization's health climate to employees' affective commitment to their organization (Ernsting et al., 2013). This causal relationship exists presumably because a robust health climate reflects that the organization cares about its employees' well-being. Future research should also explore how this relationship between team health culture and job satisfaction unfolds over time. If increasing team health culture does augment job satisfaction, then

organizations may reap serendipitous affective benefits by cultivating robust team health cultures.

Despite the current study documenting the aforementioned benefits of health culture, it failed to replicate past findings that work health culture positively predicts healthy diet choices (Sliter, 2013; Sonnentag & Pundt, 2016; Sonnentag et al., 2017). This null finding may indicate that health cultures operate differently in non-western cultures. To date, almost all of the current health culture and health climate literature has used samples from North America and Europe, and the only other study (Jia et al., 2017) that used a non-western sample (over 1500 Chinese citizens) contained many measurement flaws, including explicitly ignoring the multilevel structure of their data and using a scale that cross-contaminated objective aspects of the health environment with the health culture. As such, our knowledge about health culture in non-western samples is incredibly limited, and for multinational organizations, these null results should underscore that any organizational health culture initiative may need to be tailored to the specific locales of their employees.

Last, the current study demonstrated the robustness of employees' health motivation predicting their engagement in a variety of health behaviors. Nevertheless, despite the weaker effects of health culture in the current study, organizations should not assume that work health culture always pales by comparison to employee health motivation. As already stated, most team and department health cultures were moderate in this sample, and when situations—in this case, cultures—are weak, then individual differences typically exert stronger effects (Mischel, 1976). Thus, though the current study clearly underscores the importance of employee health motivation in making

healthy choices, organizations should still look for ways to set up the work environment to increase the likelihood that any employee will engage in health behaviors.

4.3 Limitations and Future Directions

Despite the many contributions of this study, no study is without limitations. First, due to low participation, the survey had to be translated into Vietnamese midway through the study. Translating surveys from one language to another represents a significant change that, ideally, should not be done before piloting the measure with another sample and exploring the measure's psychometric properties in the new language. Nevertheless, I controlled for survey language in all analyses, and upon inspecting the back translated survey, all items appeared similar to the English original.

Another practical limitation was that management in Company Y sent out the survey, rather than a third-party researcher. Though study participants were reassured multiple times that their responses were anonymous, participants may have been more inclined to provide socially desirable responses knowing that management was connected to the study. Furthermore, employees may have been fearful of retaliation because Company Y pays 100% of its employees' health insurance premiums, and organizations can penalize employees based on their health behaviors, especially for smoking (Loeppke, 2012). Moreover, recent research has shown that pressures to provide socially desirable responses to health information also affect Vietnamese individuals, similar to Western participants (Latkin et al., 2016; Petersen, Do, Shaw, & Brake, 2016). Future research should aim to remove management entirely from the survey process, so participants feel as confident as possible that their results are anonymous. In addition, if researchers could collect actual behavioral data, such as how often employees sign into a

worksite gym, this non-self-report data would also minimize the impact of impression management strategies.

In regard to theory, the current study suffered from deficiencies in its measurement of my conceptual model. Health culture includes the norms, climate, and objective work environment in a collective. Though each of these constructs was measured, the current study only assessed the objective work environment at the worksite level, not at the team nor department. Because my study focused on team and department health culture, this omission means that my measurement of the team and department health culture were deficient. Unfortunately, the CDC Health ScoreCard takes about 30 minutes to complete, so it would have placed an undue burden on the organization to provide information about the objective work environment for each possible team and department. As such, these practical constraints necessitated this deficiency. Future research should address this limitation by incorporating objective aspects of the physical work environment in a manner that is less burdensome to assess.

Last, the current study, like the majority of health culture and health climate research, was cross-sectional, so the data from this dissertation preclude making any causal claims about the role of health motivation or health culture in regard to health behaviors. Future research should systematically implement recommendations by past researchers (see Allen, 2002 and Golaszewski, Allen, et al., 2008) to improve the health cultures of teams and see if increases in health culture coincide with increases in other health behaviors. By contributing more experimental and longitudinal data to the field, we can better understand how health culture influences health behaviors over time.

Looking to the future, though this study's sample included both Vietnamese and American participants, it had too few Americans to do any multinational comparisons. Future studies should intentionally sample teams or organizations from Western and Eastern societies to compare how national culture can dwarf or magnify the effects of health cultures within an organization. For instance, the United States scores lower on power distance than many Eastern societies (Robert, Probst, Martocchio, Drasgow, & Lawler, 2000). As a result, the health behaviors of a supervisor in an Eastern society may exert stronger effects on the formation of a health culture than in more egalitarian societies.

Finally, the current study and all other health culture studies to date, have focused on health behaviors that influence long-term health outcomes, such as diet and exercise. However, in light of recent events regard the coronavirus (COVID-19), future research should study how health culture can relate to the prevention of infectious diseases, such as norms around handwashing and the climate regarding how permissible it is to stay at home when someone feels sick. This new dimension of health culture opens up entirely new research questions and new moderators. For instance, maintaining a healthy weight through diet and exercise primarily benefits the individual. On the other hand, preventing the spread of infectious diseases benefits the common good and may even come at a cost to the individual (e.g., quarantining oneself for 14 days). In this case, more collectivistic groups may have more compliance with behaviors related to mitigating the spread of disease than maintaining a healthy weight.

4.4 Conclusion

In sum, the results of this study made multiple novel contributions to the literature. First, it is the first study of health culture with a Vietnamese sample and the first study to simultaneously compare two levels of health culture within an organization. By doing so, it provided preliminary support for the distinctiveness between health culture at the team and department levels for vigorous physical activity. Next, though the current results fail to show any interaction between employees' health motivation and health cultures on their team or department, this study's findings document the overarching relationship that health motivation shares across a wide variety of health behaviors. Moreover, the current study provides preliminary support that employees' health motivation and their team's weight maintenance culture differentially predict vigorous physical activity; the study also provides robust evidence that both health motivation and team health culture relate to job satisfaction. As such, future researchers should continue to adopt an interactionist approach between employees' individual differences and a group's health culture. Ultimately, the current research highlights that health culture and health motivation are important factors to study further in order for organizations and researchers to improve employee health and well-being.

APPENDIX A

Health Culture Items

Health Culture Assessment (Norms and Climate; 1 Strongly Disagree – 5 Strongly Agree)

For the following questions, think about the **people in your (team/worksite)**. By your (team/worksite), we mean (team: the people that share your same supervisor (Name of supervisor) as well as your supervisor / worksite: all the people that work at (Name of worksite) with you).

Healthy Weight Maintenance Culture

- Norms
    - In general, people (on my team/at my worksite)
        - eat healthy lunches or snacks.
        - share tips on how to have a healthy diet
        - drink water instead of sugary drinks, like sodas or juice.
        - make small efforts to stay active during the workday, such as taking the stairs or getting up to walk or stretch
        - discuss having been physically active
        - exercise together or meet up at the gym together
        - take actions to improve or maintain their health
        - encourage each other to make healthy decisions
        - discuss how to live a healthy lifestyle
        - have unhealthy habits (reverse)
- Climate

- In general, people (on my team/at my worksite)
  - Think that eating healthy foods, like fruits and vegetables, is enjoyable
  - would approve of a someone reducing their consumption of sweets. (reverse)
  - Would rather someone bring healthy snacks to share instead of sweets, like donuts or candy
  - dislike exercising (reverse)
  - Would enjoy participating in a "walking meeting," taking the stairs together, or some other small way of moving more throughout the day
  - are interested in finding ways to improve their health
  - are motivated to live a healthy lifestyle.
- Being a part of this (team/worksite) makes it easy to maintain a healthy diet.
- Being a part of this (team/worksite) makes it easy to stay active.
- Being a part of this (team/worksite) makes it easy to make healthy choices.

Smoking Culture

- Norms
  - In general, people (on my team/at my worksite)
    - Take smoke breaks (reverse)
    - Talk about how much they need a cigarette (reverse)

        - never use e-cigarettes

- Climate
    - In general, people (on my team/at my worksite)
        - Would decline a free cigarette if it was offered to them.
        - think that smoking helps them to relax (reverse)
    - People at my (team/worksite) think that people should not smoke cigarettes and e-cigarettes.

Drinking Culture

- Norms
    - In general, people (on my team/at my worksite)
        - encourage or pressure other people to have an alcoholic drink (reverse)
        - have more than one or two alcoholic drinks at lunch or happy hours (reverse)
        - discuss having been hungover or drinking too much (reverse)
- Climate
    - In general, people (on my team/at my worksite)
        - Would be more inclined to attend an event together if it provided free alcohol (reverse)
        - Think that drinking alcohol helps them to relax and unwind (reverse)
        - Would like partying with alcohol (reverse)

- People at my (team/worksite) would like if our next company event involved drinking (reverse)

Work Environment

The CDC's Worksite Health ScoreCard will be used to measure the worksite health culture. As this assessment manual's instructions and items span over 15 pages, the measure can be found at **this link,** rather than including it in its entirety in this document.

Job Satisfaction Items

All in all, I am satisfied with my job.

In general, I do not like my job (R).

In general, I like working here.

Health Behavior Items

Smoking

During the past 30 days, how many days did you use cigarettes, e-cigarettes, or smokeless tobacco products?

0 - 30

Exercise

On average, how many days per week do you do VIGOROUS leisure-time physical activities for AT LEAST 10 MINUTES that cause HEAVY sweating or LARGE increases in breathing or heart rate?

1 "Never", 2 "1 – 2 Days/Week", 3 "3 – 4 Days/Week", 4 "5 – 6 Days/Week" and 5 "Every Day"

On average, how many days per week do you do LIGHT OR MODERATE LEISURE-TIME physical activities for AT LEAST 10 MINUTES that cause ONLY LIGHT sweating or a SLIGHT to MODERATE increase in breathing or heart rate?

1 “Never”, 2 “1 – 2 Days/Week”, 3 “3 – 4 Days/Week”, 4 “5 – 6 Days/Week” and 5 “Every Day”

On average, how many days per week do you do LEISURE-TIME physical activities specifically designed to STRENGTHEN your muscles such as lifting weights or doing calisthenics?

1 “Never”, 2 “1 – 2 Days/Week”, 3 “3 – 4 Days/Week”, 4 “5 – 6 Days/Week” and 5 “Every Day”

Alcohol Consumption

In the 30 days, how often did you drink any type of alcoholic beverage?

0 - 30

Diet

In general, how healthy is {your/his/her} overall diet?

Poor – Excellent

How many servings of fruit do you eat each day?

Less than 1 1 serving 2-3 servings 4-5 servings 6 or more servings

How many servings a day do you eat of sugary foods or desserts, like candy, slices of cake, cookies, and other sweets?”

6 or more 4-5 servings 2-3 servings 1 serving Less than 1 servings

How many servings of vegetables do you eat each day?

Less than 1 1 serving 2-3 serving 4-5 serving 6 or more servings

Health Motivation Items

Health Motivation (Moorman, 1990; 1 strongly disagree - 7 strongly agree)

(Preventive Orientation, Cronbach = .76)

I try to prevent health problems before I feel any symptoms.

I am concerned about health hazards and try to take action to prevent them.

I try to protect myself against health hazards I hear about.

(Curative Orientation, all reverse scored, Cronbach = .80)

I don't worry about health hazards until they become a problem for me or someone close to me.*

There are so many things that can hurt you these days. I'm not going to worry about them.*

I often worry about the health hazards I hear about, but don't do anything about them.*

I don't take any action against health hazards I hear about until I know I have a problem.*

I'd rather enjoy life than try to make sure I'm not exposing myself to a health hazard.*

Demographic Items

In general, what percentage of the time do you work remotely away from your team?

0% - 100%

In general, what percentage of the time do you work remotely away from this worksite?

0% - 100%

How long have you been employed by Company Y?

0 – 3 months 3 – 6 months 6 months – less than 1 year 1 – 2 years 3 – 4 years

5 – 6 years 7 – 8 years 9 years or more

APPENDIX B

Though at least ten measures of health climate or health culture exist (Allen & Linde, 1981; Basen-Engquist, Suchanek Hudmon, Tripp, & Chamberlain, 1998; Crimmins & Halberg, 2009; Kwon, Marzec, & Edington, 2015; Ribisl & Reischl, 1993; Schulz, Zacher, & Lippke, 2017; Scofield & Martin, 1990; Sliter, 2013; Sonnentag & Pundt, 2016; Zweber, Henning, & Magley, 2016), many either conflict with current theory or suffer from undesirable psychometric properties. For instance, some measures blur levels of analysis by asking about the organization and team, rather than parsing them apart (Sliter, 2013). Others conflate health culture with personal health values or social support outside of work (Allen & Linde, 1981; Crimmins & Halberg, 2009; Scofield & Martin, 1990). Despite these factors predicting health behaviors, they are contaminates in a measures of health culture. Furthermore, to date, no validated measure of an organization's drinking culture exists. In addition, though measures about smoking culture exist, the last measure was created over two decades ago and, thus, fail to ask about the use of e-cigarettes (Basen-Engquist et al., 1998; Ribisl & Reischl, 1993).

To address these gaps, this study establishes the validity of the Health Culture Assessment (HCA). The HCA builds off the Multilevel Psychology Model of Culture (MPMC; Sabree, 2019), which postulates that culture consists of three discrete elements: the objective work environment, the descriptive norms, and the climate. Because self-reported norms and climate are subjective, the HCA focuses only these elements, as including both objective and subjective elements on the same measure artificially inflates interrater agreement (Rousseau, 1990). Furthermore, though most health culture surveys

focus on diet and exercise, the HCA asks about these behaviors as well as smoking, alcohol consumption, and general health behaviors.

Hypothesis Regarding the Factor Structure of HCA

To establish the validity and utility of the HCA, this study makes three classes of hypotheses. The first two hypotheses concern the satisfactory statistical properties of the HCA, namely its factor structure and internal consistency.

Hypothesis 1*: The HCA will load onto five distinct factors: exercise, diet, smoking, drinking, and general health behaviors.*

Hypothesis 2: *The HCA and its subscales will show sufficient internal consistency (*$\propto$ *= .7 or greater).*

Hypotheses Regarding the Convergent and Discriminant Validity of HCA

The second set of hypotheses focus on its convergent and discriminant validity, respectively. To establish convergent validity, it would logically follow that the HCA should correlate with measures of health climate. One well-validated health climate measure is the scale for the Climate for Healthy Weight Maintenance (CHWM; Sliter, 2013). This measure focuses exclusively on exercise and diet behaviors. As such,

Hypothesis 3: *The exercise and diet subscales will positively correlate with the CHWM.*

On the other hand, when Sonnentag and Pundt (2016) validated their Organizational Health Behavior Climate (OHBC) scale, they found that the OHBC had no relationship with the organization's outward customer focus. Though the OHBC focuses only on eating and exercise behaviors, we hypothesize that this same null relationship will hold with the HCA and outward focus.

Hypothesis 4: *HCA composite scores will have no relationship to outward focus.*

Hypotheses Regarding the Concurrent Validity of HCA

The last set of hypotheses focuses on establishing concurrent validity of the HCA. In line with many studies concerning health culture and health climate, we predict that each facet of the HCA will predict health behaviors related to them (K. M. Ribisl & Reischl, 1993; Sliter, 2013; Sonnentag & Pundt, 2016; Sonnentag et al., 2017). Specifically,

Hypothesis 5: *Fitness culture will positively predict participants' engagement in light physical activity (5a), vigorous physical activity (5b), and strength training (5c).*

Hypothesis 6: *Healthy diet culture will positively predict participants' fruit consumption (6a) and vegetable consumption (6b).*

Hypothesis 7: *Anti-smoking culture will negatively predict participants' consumption of tobacco-related products.*

Hypothesis 8: *Anti-drinking culture will negatively predict participants' frequency of alcohol consumption (8a) and binge drinking (8b).*

Last, the literature has shown that health culture and health climate predict subjective health and health outcomes in addition to health behaviors (Jia et al., 2017; Schulz et al., 2017; Zweber et al., 2016). Thus, we predict that the HCA will exhibit the same pattern.

Hypothesis 9: *Participants' HCA composite score will positively predict their subjective health.*

Method

Sample

In line with recommendations for scale development by Hinkin (1998), the sample initially consisted of 303 participants from Amazon's Mechanical Turk (Mturk) platform. However, the final sample had 275 participants, as 28 participants were removed for the following reasons: failing an attention check (four participants), providing insufficient data (nine participants), or finishing the survey in under three minutes (15 participants). All participants were current full-time (35 hours or more per week) employees.

Measures

Health Culture Assessment. The HCA consisted of 30 items that covered five types of health behaviors: exercise (seven items), diet (ten items), smoking (six items), drinking (seven items), and general health behaviors (eight items). For each behavior, participants were asked about the norms and subjective climate surrounding it. In order to avoid leading participants, item order was randomized. Before completing the HCA, participants read the following instructions: "For the following questions, think about the **people in your organization**. By your organization, we mean the people employed at the company that you work for and the senior leadership at that company." Each item can be found in Table 25.

Climate for Healthy Weight Maintenance. The Climate for Healthy Weight Maintenance ($\propto$ = .86; Sliter, 2013) consists of three subscales with options ranging from 1 "Strongly Disagree" to 5 "Strongly Agree." A sample item from the general organizational support subscale is "My organization actively promotes maintaining a healthy weight." A sample item from the healthy diet norms subscale is "My coworkers usually avoid snacking

while working," and a sample item from the social support for healthy weight maintenance is "My coworkers discuss ways to maintain a healthy weight."

Outward Focus Climate. The Outward Focus items used for the study are from a subscale of the Organizational Climate Measure ($\propto$ = .78; Patterson et al., 2005). A sample item is "This company is slow to respond to the needs of the customer." All items have response scales ranging from 1 "Definitely False" to 4 "Definitely True."

Subjective Health. Subjective health was measured with one item: "In general, how would you describe your overall health?" Response options ranged from 1 "Poor" to 5 "Excellent."

Health Behaviors. Most of following health behavior questions were adapted from the Center for Disease Control's annual National Health Interview Survey (National Center for Health Statistics, 2018). As some of these items were open-ended, Likert scales were best made to reflect options provided for in the protocols.

Diet. Diet quality was assessed with three five-point Likert scale items that measure consumption of fruits and vegetables with options ranging from 1 "Less than 1" to "6 or more servings".

Physical Activity. Physical activity was assessed with two five-point Likert scale items that measure light and strenuous (i.e., exercise) physical activity. Options range are 1 "Never", 2 "1 – 2 Days/Week", 3 "3 – 4 Days/Week", 4 "5 – 6 Days/Week" and 5 "Every Day." A sample item includes "On average, how many days per week do you do VIGOROUS leisure-time physical activities for AT LEAST 10 MINUTES that cause HEAVY sweating or LARGE increases in breathing or heart rate?".

Smoking. Smoking was assessed with one continuous item: "Do you currently use cigarettes, e-cigarettes, smokeless tobacco products every day, some days, or not at all?" Options included "Not at all", "Some Days", and "Every Day."

Alcohol Consumption. Alcohol consumption was measured with three continuous items to assess drinking frequency, drinking amount, and frequency of binge drinking. All items focus on the last 30 days, and a sample item includes "Considering all types of alcoholic beverages, DURING THE PAST 30 DAYS, how many times did you have 4 or more drinks on an occasion?".

Procedure

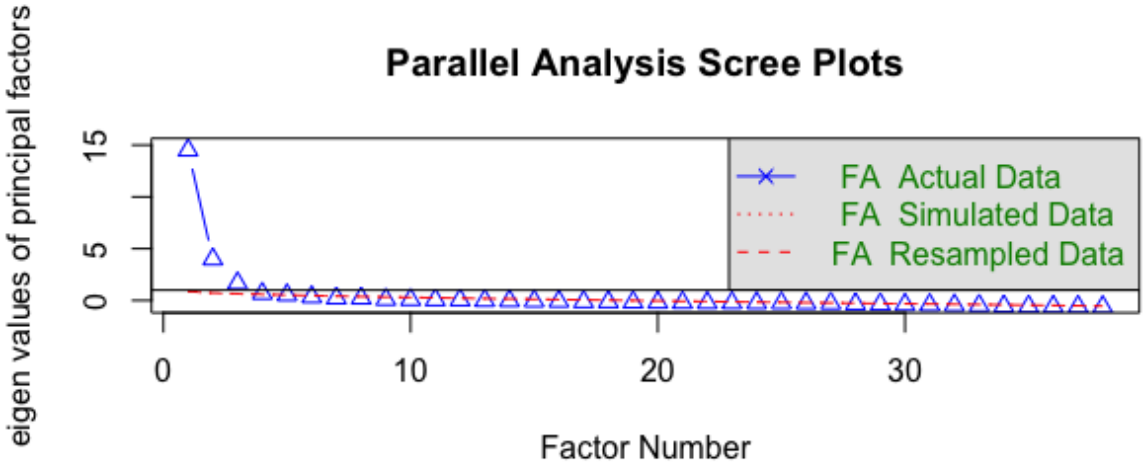
Participants who met the study criteria gave their informed consent and then completed the survey at one time point. All participants were compensated two ($2) USDs for their time.

Results

All analyses were conducted in R version 3.5.1 using the psych, car, and GPArotation packages (R Core Team, 2018). To establish the factor structure of the HCA, an exploratory factor analysis (EFA) with oblique (oblimin) rotations was conducted. Analysis of a scree plot (Figure 2) and factor loadings resulted in three factors. As hypothesized, smoking and drinking items loaded on their own factors; however, exercise, diet, and general items loaded together. Though most items loaded as expected, several items had low loadings ($r < .4$) or high cross-loadings and were removed. These include one exercise item ("In general, people at my organization would dislike participating in a company fitness-related event, such as a 5k walk/run event for charity or a "step competition"), one general item ("In general, people at my

Figure 2

Scree Plot of HCA Factors



organization do not think or care about how their behaviors influence their health"), and all items related to unhealthy eating (e.g., "In general, people at my organization bring in sweets to share, such as donuts or candy"). Factor loadings are shown both with all items (Table 25). Correlations between factors ranged from .32 to .69 (Table 26). Thus, contrary to Hypothesis 1, the HCA has three factors: healthy weight maintenance culture (Factor 1), anti-smoking culture (Factor 2), and anti-drinking culture (Factor 3). However, in line with Hypothesis 2, the HCA ($\propto$ = .95) and its subscales (weight maintenance culture $\propto$ = .96; anti-smoking $\propto$ = .90; anti-drinking $\propto$ = .88) all demonstrate excellent internal consistency.

Hypothesis 3 and 4 covered the convergent and discriminant validity of the HCA, respectively. As predicted, the weight maintenance culture as assessed by the HCA correlated highly with the CHWM (r = .89, $p < .001$). In regard to discriminant validity, the HCA composite and the organization's outward focus shared a much lower correlation (r = .29; $p < .001$). Though previous studies have shown no correlation between this measure and health climate (Sonnentag & Pundt, 2016), the CHWM also positively correlated with the outward focus (r = .17, $p = .005$). Thus, the data provide mixed support for Hypothesis 3.

Hypotheses 5 through 9 addressed the concurrent validity of the HCA. Hypotheses 5 and 6 addressed exercise and diet behaviors, respectively. Instead of predicting these behaviors with only fitness culture or healthy diet culture items, the results shown below use the newly formed healthy weight maintenance culture as the predictor, although the results are largely the same. Hypothesis 5 was supported: healthy weight maintenance culture predicted participants' frequency of light physical activity, *b*

= 0.01, $t(260) = 3.50$, $p < .001$, vigorous physical activity, $b = 0.01$, $t(260) = 3.28$, $p = .001$, and strength training, $b = 0.01$, $t(255) = 2.01$, $p = .045$.

Table 25

Factor loadings for Health Culture Assessment

Items	Factor 1 (Weight Maintenance)	Factor 2 (Smoking)	Factor 3 (Drinking)	h^2	u^2
*Think that eating healthy foods, like fruits and vegetables, is enjoyable	**0.73**	0.01	0.02	0.56	0.44
*Would approve of someone reducing their consumption of sweets -	**0.61**	0.16	-0.1	0.42	0.58
*Would rather someone bring healthy snacks to share instead of sweets, like donuts or candy	**0.7**	-0.07	0.16	0.54	0.46
Being a part of this organization makes it easy to maintain a healthy diet	**0.7**	0.12	0.07	0.6	0.4
*Eat healthy lunches or snacks	**0.78**	0.03	0.04	0.65	0.35
*Share tips on how to have a healthy diet	**0.83**	-0.06	-0.04	0.64	0.36
*Drink water instead of sugary drinks, like sodas or juice	**0.66**	0.19	-0.05	0.53	0.47
*Would be more inclined to attend an event together if it provided free alcohol -	0.1	-0.06	**0.82**	0.69	0.31
*Think that drinking alcohol helps them to relax and unwind -	0	-0.01	**0.8**	0.64	0.36
*Would like partying with alcohol -	0.06	0.07	**0.74**	0.62	0.38
People at my organization would like if our next company event involved drinking -	0	-0.1	**0.87**	0.7	0.3
*Encourage or pressure other people to have an alcoholic drink -	-0.27	0.31	**0.46**	0.36	0.64

*Have more than one or two alcoholic drinks at lunch or happy hours -	-0.1	0.33	**0.43**	0.36	0.64
*Discuss having been hungover or drinking too much -	-0.03	0.31	**0.57**	0.53	0.47
*Dislike exercising -	**0.65**	0.13	0.09	0.54	0.46
*Would dislike participating in a company fitness-related event, such as a 5k walk/run event for charity or a "step competition"⊥	0.25	0.08	0.2	0.17	0.83
*Would enjoy participating in a "walking meeting," taking the stairs together, or some other small way of moving more throughout the day	**0.78**	-0.13	0.08	0.6	0.4
Being a part of this organization makes it easy to stay active	**0.73**	-0.05	0.02	0.53	0.47
*Make small efforts to stay active during the workday, such as taking the stairs or getting up to walk or stretch	**0.68**	-0.05	0.01	0.44	0.56
*Discuss having been physically active	**0.84**	-0.04	-0.03	0.67	0.33
*Exercise together or meet up at the gym together	**0.71**	-0.17	0.04	0.47	0.53
*Are interested in finding ways to improve their health	**0.86**	0	-0.04	0.71	0.29
*Are motivated to live a healthy lifestyle	**0.88**	-0.02	0.02	0.76	0.24
*Do not think or care about how their behaviors influence their healthy - ⊥	0.36	0.4	0.07	0.43	0.57
Being a part of this organization makes it easy to make healthy choices	**0.76**	0.1	0.07	0.69	0.31
*Take actions to improve or maintain their health	**0.81**	0.1	-0.07	0.68	0.32
*Encourage each other to make healthy decisions	**0.83**	0.03	-0.02	0.7	0.3
*Discuss how to live a healthy lifestyle	**0.86**	-0.01	-0.06	0.71	0.29
*Have unhealthy habits -	**0.54**	0.22	0.27	0.62	0.38
*Snack throughout the day on foods like chips and sweets - ⊥	0.26	0.32	0.31	0.45	0.55

*Skip lunch or eat hurriedly at their desk or workstation - ⊥	0.12	0.12	0.19	0.1	0.9
*Bring in sweets to share, such as donuts or candy - ⊥	0.19	0.1	0.37	0.26	0.74
*Would decline a free cigarette if it was offered to them	0.22	**0.69**	-0.07	0.58	0.42
*Think that smoking helps them to relax -	-0.02	**0.82**	0.1	0.73	0.27
People at my organization think that people should not smoke cigarettes and e-cigarettes	0.23	**0.61**	-0.06	0.5	0.5
*Take smoke breaks -	-0.04	**0.87**	-0.06	0.7	0.3
*Talk about how much they need a cigarette -	-0.03	**0.87**	0.05	0.77	0.23
*Never use e-cigarettes	0.08	**0.5**	0.1	0.34	0.66

* Item starts with the prompt, "In general, people at my organization"
- Item is reverse scored
⊥ Item deleted from measure due to poor factor loadings

Table 26

Correlation Among HCA Factors and Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HCA Composite	1														
WM Culture	.92*	1													
AS Culture	.69*	.43*	1												
AD Culture	.61*	.32*	.45*	1											
HW Climate	.82*	.88*	.38*	.28*	1										
Outward Focus	.29*	.25*	.17*	.25*	.17*	1									
Fruit Intake	.14*	.17*	.02	.03	.26*	0	1								
Veg. Intake	.11	.14*	.04	.01	.20*	.12	.45*	1							
Light Exercise	.18*	.21*	.09	.02	.20*	.24*	.23*	.32*	1						
Vig. Exercise	.14*	.20*	0	0	.22*	.06	.36*	.34*	.61*	1					
Strength Training	.12*	.21*	0	-.10	.29*	0	.35*	.35*	.47*	.69*	1				
Smoking	0	-.10	-.23*	.02	-.20*	.06	0	.02	.04	0	0	1			
Drinking	0	.09	-.10	-.30*	.11	-.20*	0	0	0	.05	.07	-.20*	1		
Binge Drinking	0	.07	-.10	-.20*	.15*	-.40*	.12	.04	-.10	.02	.09	-.30*	.70*	1	
Subjective Health	.23*	.26*	.06	.10	.29*	.18*	.35*	.23*	.32*	.39*	.36*	0	0	0	1

HCA Composite = Health Culture Assessment composite scores; WM Culture = HCA Weight maintenance culture subscale score; AS Culture = HCA Anti-smoking culture subscale score; AD Culture = HCA Anti-drinking culture subscale score; HW Climate = Healthy weight maintenance climate score; Outward Focus = Organizational outward focus; Vig. Exercise = Vigorous Exercise; Veg. Intake = Vegetable intake

* $p < .05$

Hypothesis 6 stated that healthy weight maintenance culture would predict fruit and vegetable consumption. Hypothesis 6 was supported: healthy weight maintenance culture predicted fruit consumption, $b = 0.01$, $t(265) = 3.05$, $p = .002$, and vegetable consumption, $b = 0.01$, $t(260) = 2.30$, $p = .022$.

Hypothesis 7 and 8 focused on smoking drinking behaviors, respectively. Both hypotheses were supported. Anti-smoking culture negatively predicted participants' smoking behavior, $b = -0.02$, $t(266) = -3.82$, $p < .001$. Similarly, anti-drinking culture negatively predicted participants' frequency of alcohol consumption, $b = -0.34$, $t(267) = -5.06$, $p < .001$, as well as their frequency of binge drinking, $b = -0.21$, $t(262) = -4.09$, $p < .001$.

Last, Hypothesis 9 predicted that participants' HCA composite score would predict their self-reported health. Hypothesis 9 was supported: the more robust the health culture, the better health that participants reported, $b = -0.01$, $t(255) = 3.72$, $p < .001$.

Discussion

The current study provided support for the validity of the HCA as a measure of health culture. The present data show that health culture consists of three factors: healthy weight maintenance, anti-smoking, and anti-drinking cultures. Furthermore, the HCA shows strong internal consistency and multiple indicators of validity. The HCA's healthy weight maintenance subscale shows strong convergent validity with Sliter's (2013) CHWM. Furthermore, though HCA composite scores shared a stronger relationship with an organization's outward focus than past research (Sonnentag & Pundt, 2016), its relationship was considerably weaker and mirrored the CHWM's relationship with the construct. Thus, the HCA also demonstrated sufficient discriminant validity as well. The

HCA positively predicted a wide range of health behaviors, including consumption of fruits and vegetables and engagement in light, vigorous, and strength-focused physical activities. Similarly, the HCA negatively predicted smoking behaviors as well as alcohol consumption and binge drinking. Finally, in addition to predicting health behaviors, HCA composite scores also positively related to participants' self-reported health.

Implications for Theory

This study contributes to the literature in three primary ways. First, the current study shows that the HCA exhibits strong psychometric properties and makes a strong case for its validity. Second, to our knowledge, the HCA is the first validated measure of an organization's drinking culture, and unlike previous measures of smoking culture, the HCA explicitly asks about both cigarettes and e-cigarettes. Third, unlike other measures of health culture, the HCA was designed to be easily scalable. For instance, the item "In general, people in my organization take smoke breaks" could be modified to refer to "people on my team" or "people in my department." This malleability will allow researchers to study and compare health culture at multiple levels of an organization. As researchers begin to quantify the multilevel aspects of culture, alignment across levels represents a promising avenue for future research (e.g., see Bezrukova, Thatcher, Jehn, & Spell, 2012).

Implication for Practice

With the HCA, practitioners now have a validated measure of their company's weight maintenance, smoking, and alcohol cultures. Furthermore, this study provides support that organizations should continue to monitor their health culture, as employees'

perceptions of organization's health culture predicted their health and engagement in a range of health behaviors.

Limitations and Future Directions

One limitation is that participants completed all items at one time point. Though some researchers question the significance of common method bias (Spector, 2006), the effects capture in this study may be inflated. As such, future studies should compare employee's self-reported health culture with objective measures of health and health behaviors.

In the same vein, researchers theorize that culture must be shared among individuals. With that requirement, one person per organization cannot report the health culture, as interrater agreement has not been established to demonstrate that their perceptions are, in fact, shared. As the main purpose of the current study was measurement development, verifying the 'sharedness' of participant's perceptions was not important. Nonetheless, future studies should rely on multiple individuals from a collective to ensure that the health culture is shared and not due to the idiosyncratic perceptions of one individual.

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APPENDIX C

Source	Target
Vui lòng chọn bộ phận mà bạn hiện đang làm việc.	Please select the department in which you are currently working.
Nếu bạn làm việc ở nhiều bộ phận, hãy chọn bộ phận mà bạn làm việc thường xuyên nhất. Trung bình bao nhiêu giờ trong tuần bạn gặp các thành viên trong cùng bộ phận?	If you are working in multiple departments, select the department in which you are working most often. On average, how many hours a week do you meet the members of the same department?
Bao gồm cả trong và ngoài giờ làm việc. Vui lòng chọn người quản lí của bạn. Đây là người mà bạn báo cáo trực tiếp và là người đánh giá hiệu suất làm việc của bạn.	Including during working hours and non-working hours. Please select your manager. This is the person who you report directly to and who evaluates your performance.
Trung bình bao nhiêu giờ trong tuần bạn gặp hầu hết mọi người trong nhóm (gồm người quản lí trực tiếp và các thành viên khác trong nhóm)? Bao gồm cả trong và ngoài giờ làm việc.	On average, how many hours a week do you meet most people of the team (including line managers and other team members)? Including during working hours and non-working hours.
Bạn đã bao lâu...	How long have you...
là thành viên bộ phận của bạn	been a member of your department?
báo cáo với người quản lý trực tiếp của bạn	reported to your line manager?
0 – 3 tháng	0 – 3 months
3 – 6 tháng 6 tháng – ít hơn 1 năm 1 – 2 năm 3 – 4 năm	3 – 6 months 6 months – less than 1 year 1 – 2 years 3 – 4 years
5 – 6 năm	5 – 6 years
7 – 8 năm	7 – 8 years
9 năm hơn	Over 9 years
Đối với các câu hỏi sau đây, hãy nghĩ về những người trong nhóm của bạn.	For the following questions, think about the members of your team,
Nhóm của bạn ở đây bao gồm các thành viên cùng chung người quản lí trực tiếp.	who are under the same line manager.
Nhìn chung, mọi người trong nhóm của tôi...	In general, the members of my team...
dùng các bữa trưa và bữa ăn nhẹ lành mạnh	have healthy lunch and snacks
ra ngoài hút thuốc	smoke outside
khuyến khích hoặc ép người khác uống rượu có nỗ lực nhỏ để duy trì hoạt động trong ngày làm việc, chẳng hạn như di chuyển bằng cầu thang bộ hoặc dậy sớm để đi bộ hay kéo giãn cơ	encourage or force others to drink alcoholic liquor make small efforts to maintain activities during the workday, such as using stairs or getting up early to walk or stretch

có hành động để cản thiện hoặc duy trì sức khỏe của họ quan tâm đến việc tìm cách cải thiện sức khỏe của họ	take actions to improve or maintain their health take care of finding ways to improve their health
được tạo động lực để sống một lối sống lành mạnh	are motivated to live a healthy lifestyle
không thích vận động sẽ có xu hướng tham dự một sự kiện cùng nhau nếu sự kiện được uống bia/ rượu miễn phí	don't like to be active tend to attend an event together if beer/wine is served at no charge in such event
nghĩ rằng uống bia/ rượu giúp họ thả lỏng và thư giãn sẽ từ chối một điếu thuốc miễn phí nếu được mời nghĩ rằng hút thuốc giúp họ thư giãn	think that drinking beer/wine helps them relax will refuse a free cigarette if offered think that smoking helps them relax
thích ăn thực phẩm lành mạnh, như trái cây và rau quả	like to eat healthy foods, such as fruits and vegetables
sẽ đồng thuận nếu ai đó giảm tiêu thụ đồ ngọt của họ	will agree if someone reduces their consumption of sweets
chia sẻ những lời khuyên để có chế độ ăn uống lành mạnh uống nước thay vì đồ uống có đường, như soda hoặc nước ép đóng chai	share tips for a healthy diet drink water instead of sugary drinks, such as soda or bottled juice
nói về việc họ cần hút thuốc đến nhường nào	talk about how much they need to smoke
dùng nhiều hơn một hoặc hai ly bia/rượu vào bữa trưa hoặc happy hours thảo luận về hoạt động thể chất khuyến khích nhau đưa ra những quyết định lành mạnh	drink more than one or two glasses of beer/wine at lunch or happy hours discuss about physical activities encourage each other to make healthy decisions
thích tham gia vào một "cuộc họp đi bộ", đi cầu thang bộ cùng nhau, hoặc tham gia các hoạt động nhỏ khác cùng nhau trong suốt cả ngày làm việc thích bữa tiệc đi kèm với bia/rượu thích ai đó mang đồ ăn nhẹ lành mạnh để cùng ăn hơn là những đồ ngọt như bánh donuts, kẹo	like to participate in a "walking meeting", take the stairs together, or participate in other small activities all working days like the parties with beer/wine prefer healthy snacks to sugary items such as donuts, candies
không bao giờ sử dụng thuốc lá thảo luận về việc uống quá nhiều cùng nhau tập thể dục hoặc gặp nhau tại phòng tập thể dục	never smoke discuss about overdrinking work out together or meet at the gym
thảo luận làm thế nào sống lành mạnh	discuss how to live a healthy life
có thói quen không lành mạnh	have unhealthy habits
Là một thành viên của nhóm giúp bạn dễ dàng đưa ra những sự lựa chọn lành mạnh. Là một thành viên của nhóm giúp bạn dễ dàng chủ động	As a member of the team, you easily make healthy choices. As a member of the team, you easily to be proactive
Mọi người trong nhóm của tôi nghĩ rằng mọi người không nên hút thuốc.	Everyone in my team thinks that people shouldn't smoke.
Là một thành viên của nhóm giúp bạn dễ dàng duy trì chế độ ăn uống lành mạnh	As a member of the team, you easily maintain a healthy diet

Mọi người trong nhóm của tôi muốn sự kiện tiếp theo của công ty có phục vụ nước uống có cồn	Everyone in my team hopes that alcoholic drinks will be served at the company's next event
Đối với các câu hỏi sau, hãy nghĩ về những người trong bộ phận của bạn mà bạn đã xác định khi bắt đầu cuộc khảo sát này. Điều này bao gồm những người và các nhà lãnh đạo trong các nhóm khác trong cùng bộ phận này.	For the following questions, think about the people in your department identified at the beginning of this survey. These include people and leaders in other teams within this department.
Nếu bạn đã chọn A +, Gnopus, Revo hoặc Turing, giới hạn trong những người làm việc với các khách hàng cụ thể mà bạn đã chọn.	If you have selected A+, Gnopus, Revo or Turing, the target should be limited to those who work with specific customers you have selected.
Nhìn chung, mọi người trong bộ phận của tôi:	In general, the people in my department:
Làm việc trong bộ phận này giúp bạn dễ dàng đưa ra những sự lựa chọn lành mạnh.	Working in this department makes it easy for you to make healthy choices.
Làm việc trong bộ phận này giúp bạn dễ dàng chủ động hơn	Working in this department makes it easy for you to be proactive
Mọi người trong bộ phận nghĩ rằng mọi người không nên hút thuốc.	Everyone in the department thinks that people shouldn't smoke.
Làm việc trong bộ phận này giúp bạn dễ dàng duy trì chế độ ăn uống lành mạnh	Working in this department makes it easy for you to maintain a healthy diet
Mọi người trong bộ phận muốn sự kiện tiếp theo của công ty có phục vụ nước uống có cồn	Everyone in my department hopes that alcoholic drinks will be served at the company's next event
Trả lời các câu hỏi sau đây về bản thân.	Answer the following questions about yourself.
Không có câu trả lời đúng hay sai cho những câu hỏi này. Nhìn chung, tôi hài lòng với công việc của tôi	There are no right or wrong answers to these questions. In general, I am satisfied with my work
Nhìn chung, tôi không thích công việc của tôi	In general, I don’t like my work
Nhìn chung, tôi thích làm việc ở đây	In general, I like working here
Khi ai đó chỉ trích KMS, cảm giác giống như là một sự xúc phạm cá nhân Tôi rất quan tâm đến những gì người khác nghĩ về KMS Khi tôi nói về KMS, tôi thường sử dụng chủ từ “chúng tôi” thay vì “họ”	When someone criticizes KMS, it feels like a personal insult I am concerned about what others think of KMS When I talk about KMS, I often use the subject "we" instead of "they"
Sự thành công của KMS là sự thành công của tôi	The success of KMS is mine
Khi ai đó khen ngợi KMS, cảm giác giống như là một thành tích cá nhân Nếu một câu chuyện trên các phương tiện truyền thông chỉ trích KMS, tôi sẽ cảm thấy xấu hổ.	When someone praises KMS, it feels like a personal achievement If a story in the media criticized KMS, I would be ashamed at.
Tôi cố gắng ngăn ngừa các vấn đề sức khỏe trước khi tôi cảm thấy có bất kỳ triệu chứng nào. Tôi lo ngại về các mối nguy hại sức khỏe và cố gắng hành động để ngăn chặn chúng.	I try to prevent health problems before any symptoms can happen. I am concerned about health problems and try to prevent them.

Tôi cố gắng bảo vệ bản thân trước những mối nguy hại sức khỏe mà tôi biết. Tôi không lo lắng về các mối nguy hại cho sức khỏe cho đến khi chúng trở thành vấn đề đối với tôi hoặc người thân của tôi Ngày nay, có quá nhiều tác nhân nguy hại cho sức khoẻ, nhưng tôi không lo lắng về chúng.	I try to protect myself from the known health problems. I am not worried about health problems until they become a problem for me or my relatives There are so many health hazards today, but I'm not worried about them.
Tôi thường lo lắng về các mối nguy hại cho sức khỏe mà tôi biết, nhưng lại không có hành động ngăn ngừa chúng. Tôi không chống lại những tác nhân nguy hại cho sức khỏe trừ khi tôi có vấn đề về sức khoẻ	I often worry about my known health problems, but I don't take actions to prevent them. I am not against harmful hazards unless I have health problems
Tôi thà tận hưởng những gì tôi thích hơn là phải quá cẩn thận với mối nguy hại về sức khỏe.	I would rather enjoy what I like than be too careful about health hazards.
Nhìn chung, bạn đánh giá sức khỏe tổng thể của mình ở mức độ nào?	In general, how do you rate your overall health?
Kém	Weak
Tạm ổn Trung bình Tốt Xuất sắc	Fine Average Good Excellent
Bạn hiện có đang hút thuốc lá, thuốc lá điện tử và các sản phẩm thuốc lá không khói không? Có Không	Are you currently using cigarettes, e-cigarettes and smokeless tobacco products? Yes No
Trong 30 ngày vừa qua:	For the last 30 days:
Bao nhiêu ngày bạn đã hút thuốc lá, thuốc lá điện tử và các sản phẩm thuốc lá không khói? ()	How many days have you used cigarettes, e-cigarettes and smokeless tobacco products? ()
Trung bình bao nhiêu ngày trong tuần, bạn vận động ít nhất 10 PHÚT để vã mồ hôi hoặc làm tăng mạnh nhịp thở và nhịp tim? Không bao giờ 1 – 2 ngày/ tuần	On average, how many days a week do you exercise for at least 10 MINUTES to perspire or rapidly increase your breathing and heart rate? Never 1 – 2 days/week
Mỗi ngày Trung bình bao nhiêu ngày trong tuần, bạn thực hiện hoạt động thể chất nhẹ và vừa phải trong ít nhất 10 PHÚT để đổ ít mồ hôi hoặc làm tăng vừa phải nhịp thở và nhịp tim?	Every day On average, how many days a week do you have light or moderate physical activities for at least 10 MINUTES to perspire or rapidly increase your breathing and heart rate?

Bạn có thường xuyên tham gia các hoạt động thể chất được thiết kế đặc biệt để TĂNG CƯỜNG cơ bắp của bạn, chẳng hạn như nâng tạ hoặc tập thể hình?	Do you regularly have physical activities specially designed to INCREASE your muscles, such as lifting weights or bodybuilding?
Bao nhiêu ngày bạn đã uống ít nhất một đồ uống có cồn? Nhìn chung, bạn đánh giá chế độ ăn uống lành mạnh của mình ở mức độ nào?	How many days have you drunk at least one alcoholic beverage? In general, how do you rate your healthy diet?
Mỗi ngày, bạn ăn bao nhiêu khẩu phần trái cây?	How many servings of fruits do you eat a day?
Không ăn 6 lần hoặc nhiều hơn Mỗi ngày bạn dùng bao nhiêu khẩu phần thực phẩm có đường hoặc những món tráng miệng, như kẹo, lát bánh, bánh quy và các đồ ngọt khác?	None 6 or more How many servings of sugary foods or desserts, such as candies, slices of bread, cookies, and other sweets a day?
Mỗi ngày, bạn ăn bao nhiêu khẩu phần rau?	How many servings of vegetables do you eat a day?

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